THE BRITISH JOURNAL
OF
OPHTHALMOLOGY,
JUNE, 1927

COMMUNICATIONS

BRITISH MASTERS OF OPHTHALMOLOGY SERIES

20.—ARTHUR JACOB, 1790-1874

BY
R. R. JAMES
LONDON

ALTHOUGH this distinguished Irishman was perhaps better known to his contemporaries as an anatomist than as an ophthalmic surgeon, his original work was of high value and he was the author of an ophthalmic textbook which had a deservedly high reputation in its day, and is now regarded as one of the classics of the subject. He was also the designer of the special cataract needle that bears his name; it seems right, therefore, to include him in the series of British ophthalmological biographies that is being published in this journal.

An account of Jacob is to be found in Boase's *Modern Biography;* but the first part of what follows is mainly extracted from Cameron's *History of the Royal College of Surgeons in Ireland*, of which body Jacob was twice President; *viz.*, in 1837 and in 1864.

"Arthur Jacob was born on June 13, 1790, at Knockfin, Queen's County. His father, John Jacob, Surgeon to the Queen's County Infirmary, enjoyed a large practice in the midland counties; and his grandfather, Michael Jacob, was also a surgeon. The Jacobs

were a family who in the 13th century held lands in Cambridgeshire.* The first of them who settled in Ireland received a grant of land at Sigginstown in Co. Wexford, in 1667, and his descendants (at first numerous) divided into two branches, the senior of which settled in Queen's County. The English Jacobs having become extinct, Arthur Jacob became the senior representative of this old family. Surgeon John Jacob died at Maryborough on June 24, 1827. His wife, Grace, only child of Jerome Alley of Donaghmore, Queen's County, survived till 1835, when she died in Dublin, and was interred in St. Mary's churchyard.

"Arthur Jacob, having received a sound preliminary education, was indentured on March 7, 1808, to his father; entered the College School in 1811; and became a pupil at Steevens's Hospital, under Colles. In 1813, he proceeded to Edinburgh, and graduated M.D., Edin., in 1814." The title of his thesis was *de Aneurismate*.

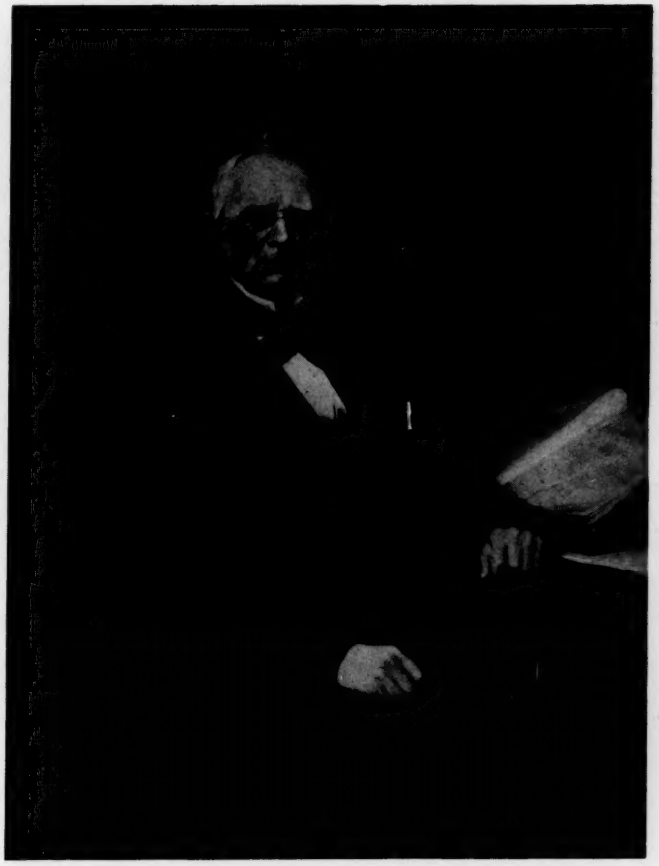
"In 1815 he was in London, attending the *cliniques* of Lawrence, Brodie and Cooper, and secured the friendship of those great surgeons." I do not find that he ever signed the pupils' register, under Brodie, at St. George's Hospital.

"Returning to Dublin he was appointed a Demonstrator of Anatomy in the School of Trinity College, Dublin, and retained that position until 1824, when, together with Cusack and others, he founded the Park Street School. On November 20, 1813, he became a Licentiate of the College, and on August 5, 1816, a member; subsequently he attained to almost every office of importance in connection with the College. In 1826, he was elected their Professor of Anatomy and Physiology. In 1852, he was one of the College Professors who founded the City of Dublin Hospital. In conjunction with Henry Maunsel he established in 1838, the *Dublin Medical Press*. In 1869, he resigned the Professorship and retired to Barrow-in-Furness, in Lancashire, where he died on September 21, 1874, aged 85 years.

"Arthur Jacob married Sarah, daughter of Coote Carroll, of Ballymote, Co. Sligo. Their family consisted of five sons, all of whom lived to manhood, and one daughter, who died in infancy. One of his sons, Archibald Hamilton, is Secretary to the College Council."

Jacob was an uncompromising champion for the College School and in the History of the College his name frequently occurs. In the debates which occurred at the meetings of the College he always took a leading part, and was by no means "mealy-mouthed" in reference to those from whose opinions he differed. As a writer he was much given to drastic polemical articles, which frequently greatly irritated those against whom they were directed.

*Since this paper was written I have been informed that the family tradition is that the Jacobs migrated from Holland to Great Britain in the 7th century. The English branch of the family is not extinct. I do not know from what source Cameron obtained his information.



ARTHUR JACOB, 1790-1874.

UNIV. OF MICH.

He rarely indulged in even the mildest festivities, but devoted himself wholly to his professional and editorial work, and to original research. He remained up till long after midnight as a rule, nevertheless he was always punctually at work early in the day. He had an intense dislike to charlatanism and humbug of every kind. He took a deep interest in the success of his pupils, and he laboured hard to instruct them. One of his few weaknesses was his notion that he alone of the professors should always give the introductory lecture at the commencement of the session at the College school. In 1860, there was a strong desire to present Jacob with a testimonial, but he decisively opposed the proposal. However, a very beautiful medal, in his honour, was struck. The obverse bears his bust, and the reverse the following words:— "Arthur Jacob, M.D., F.R.C.S.I., Prof. of Anat. and Phys., Roy. Coll. of Surgeons in Ireland, in commemoration of eminent services rendered to the profession in Ireland, 1860."

Jacob's original work is of high value. In 1819, he published, in the *Philosophical Transactions*, his discovery of the delicately-constructed membrane now known as the bacillary layer of the retina. It was named, but not by its discoverer, Membrana Jacobi. He described in the *Dublin Journal of Medical Science*, for 1836, the infra-orbital sinuses of deer, and the mouth and mammary gland of the cetacea. He was the first to give an account of rodent ulcer, at one time termed Jacob's ulcer. He invented the curved needle for cataract which bears his name. His work on "Inflammation of the Eyeball" is a classic on that subject. On March 7, 1867, the Council of the Irish College of Surgeons resolved to have a portrait in oils and a bust in marble of Professor Jacob executed. It was also decided to present him with a piece of plate of the value of 100 guineas. The portrait was painted by Mr. Catterson-Smith, and the bust was by Mr. Kirk."

Jacob served for a longer period as a professor in the College School in Dublin than anyone before him, *viz.*, 41 years.

Membrana Jacobi

Jacob's paper describing his discovery of the layer of rods and cones was read on July 1, 1819; it is printed in the *Philosophical Transactions* for 1819, p. 300. It is quite a short paper, and I have abstracted the opening sentences as follows:

"I find that the retina is covered on its external surface by a delicate transparent membrane, united to it by cellular substance and vessels . . . . I first observed this in the spring of last year, and have demonstrated it frequently since."

His method was as follows: "Having procured a human eye, within 48 hours after death, a thread should be passed through the layers of the cornea, by which the eye may be secured under water, by attaching it to a piece of wax, previously fastened to the bottom

of the vessel, the posterior half of the sclerotic having been first removed. With a pair of dissecting forceps in each hand, the choroid coat should be gently torn open and turned down. If the exposed surface be now carefully examined, an experienced eye may perceive that this is not the appearance usually presented by the retina; instead of the blue-white reticulated surface of that membrane, a uniform villous structure, more or less tinged by the black pigment, presents itself. If the extremity of the ivory handle of a dissecting knife be pushed against this surface, a breach is made in it, and a membrane of great delicacy may be separated and turned down in folds over the choroid coat, presenting the most beautiful specimen of a delicate tissue which the human body affords. If a small opening be made in the membrane, and the blunt end of a probe introduced beneath, it may be separated throughout, without being turned down, remaining loose over the retina; in which state if a small particle of paper or a globule of air be introduced under it, it is raised so as to be seen against the light, and is thus displayed to great advantage; or it is sometimes so strong as to support small globules of quicksilver dropped between it and the retina, which renders its membranous nature still more evident. If a few drops of acid be added to the water after the membrane has been separated, it becomes opaque and much firmer, and may thus be preserved for several days, even without being immersed in spirit. That it is not the nervous layer which I detach, is proved by the most superficial examination; first, because it is impossible to separate that part of the retina, so as to present the appearance I mention; and, secondly, because I leave the retina uninjured, and presenting the appearance described by anatomists, especially the yellow spot of *Soemmering*, which is never seen to advantage until this membrane be removed: and hence it is that that conformation, as well as the fibrous structure of the retina in some animals, becomes better marked from remaining some time in water, by which the membrane I speak of is detached." The appearance of the membrane at different periods of life is also described.

A Treatise on the Inflammations of the Eyeball

As already stated, this book is one of the classics of ophthalmology. It is really a reprint of various detached essays that came out in the *Dublin Medical Press*, during the years 1847-1848; the book was published in 1849.

As the ophthalmoscope was introduced by von Helmholtz in 1851, Jacob's work is one of the latest, if not the last of the English textbooks to appear before that epoch-making discovery. I conclude that one of the reasons for its publication, though the author does not say so, was that there must have been a distinct opening for a small practical handbook on the more important

inflammatory diseases of the eye. The medical student, whose primary object is to obtain his qualification, does not, as a rule, like to have to read large textbooks on the special senses. The works of MacKenzie, Lawrence, and Tyrrell were all large books, more suited for the practitioner and senior student than for the rank and file, and Jacob's severely practical work must have been a boon to the latter class of students.

It is a small octavo of 340 pages and the contents are sufficiently indicated by the title. There are no illustrations. The symptoms and signs of inflammation of the various tunics of the globe are carefully described and the methods of treatment are discussed at length. The following excerpts are taken at random.

With regard to intolerance of light in inflammation, "the practice so commonly pursued of immuring persons suffering from inflammation of the eye in a dark room is founded on a vulgar error. I do not deny that intolerance of light often takes place, but I do not believe that it is a necessary consequence of inflammation . . . . in hospital I have no green walls or shaded windows, and in private practice I never permit the light to be excluded, unless intolerance of it actually exists. If the patient has followed the usual unhealthy practice of sleeping in a bed hung round with curtains to exclude light and confine foul air; in a room with closed windows in addition, I cannot perhaps venture to alter this bad habit at once, but I do all I can to mitigate the evil by insisting on some illumination of the room, and some ventilation round the patient; so inveterate, however, is the prejudice in favour of these objectionable domestic arrangements, that I find great difficulty in obtaining consent to a change."

A description of keratic precipitates is as follows: "In some cases, and more particularly in syphilitic inflammation of the eye, the back of the cornea presents a remarkable form of opacity. It appears speckled with faint dots, as if spattered with thin white paint from a brush; but this is, evidently, in the membrane of the aqueous humour . . . . it requires care to distinguish it. Looking directly at the eye from some distance it appears as a general cloudiness of the cornea, or even of the conjunctival layer of it; but looking closely at it with a lens of short focus, the faint, speckled, or dotted appearance is perceived; still it is not easy to demonstrate that it is on the back of the cornea. To be certain of its being situated there the eye must be viewed sideways or in profile, with the light shaded off so as to prevent the reflection from the surface."

With regard to the state of an old inflamed iris, "the pupil when closed and adherent to the capsule is generally found not only motionless but entirely unaffected by extract of belladonna—and in any attempt to form an artificial pupil the iris stretches

under the instrument like a lifeless membrane, and affords so little resistance that an opening can be made in it by an extensive sweep of the knife only, or by a large cut of the scissors."

Excessive bleedings are to be avoided if possible; *i.e.*, phlebotomy; Jacob is very sure of this fact. Hot bathings are extolled, but exposure of the eye to steam rising from a vessel of boiling water is not recommended. Mercury and atropine are highly praised in the matter of treatment, as are iodine and turpentine in iritis.

"Festina lente is frequently the maxim to be inculcated, and in accordance with it, I generally find myself acting. In private practice, when I am permitted to have my own way, I am in the habit of commencing by getting rid of all those encumbrances which accumulate in a sick room, and making such arrangements as will secure the admission of light, and fresh air: an object often difficult of accomplishment; such places being generally more like the crowded storerooms of furniture dealers than apartments provided for human beings."

A very noticeable feature of the work is the way in which extracts from the works of others, such as MacKenzie, Wardrop, Lawrence, and Tyrrell, are inserted.

Interstitial keratitis is of course not recognized as being of syphilitic origin; but it is easy in reading the section on scrofulous inflammation of the eyeball to see that many of the statements fit in with this disease.

"No inflammation of the eye should be pronounced scrofulous unless the local disease or the constitutional peculiarities fully justify it." If only he had gone a little further he might have anticipated Hutchinson. What better description of the cornea in interstititial keratitis than the following could be given:

"A general haziness or milky hue, and a remarkable roughness or loss of polish on the surface of the conjunctival layer, or a slight loss of transparency, having more of a yellowish tint, as if some very slight effusion had taken place in the structure of the part. Very deep seated small white opacities, generally in or near the centre, are also sometimes to be seen. It also in cases of long duration, is pervaded by vessels carrying red blood, and becomes permanently opaque."

I cannot resist quoting the final paragraphs from his last chapter on neuralgic inflammation of the eyeball, in view of the present-day habit of looking so askance at pyorrhoea in cases of iritis.

"Since the above was written I have seen a communication from Dr. Hays of Philadelphia, in the *American Journal of Medical Science*, which affords some illustration of the above observations. It contains an account of three or four cases of 'exalted sensibility' of the retina from disease affecting the teeth. In one, pressure

on the lateral incisor causing pain, that tooth was extracted; after which the intolerance of light, previously most distressing, and 'a disagreeable gnawing or pinching sensation at the back of the eye' ceased. An abscess was found at the point of the fang. In another case, a gentleman who had suffered two years previously from a slight attack of iritis; upon recovery experienced, when he attempted to read, a peculiar uneasiness in his eyes. After the extraction of a tooth, at the root of which an abscess was found, he was entirely relieved. In a third case, a young lady subject to frequent severe attacks of inflammation in the eyes, with excessive intolerance of light, was greatly relieved by the extraction of some decayed teeth.

I here bring to a conclusion these inquiries respecting the inflammations of the eyeball. They embrace some of the most important diseases of this organ, and bring together facts and results calculated to instruct by comparison. I am convinced that the subject is one not only of importance as regards the inestimable value of sight, but as affording most valuable illustrations of disease in general."

Charles Lever, who studied medicine in Dublin, has immortalized one of the prominent Irish medical men in the "Confessions of Harry Lorrequer," namely, Cusack Roney; one would have thought that the polemical Jacob would have offered equal facilities for reproduction in one of Lever's novels, but I am not aware that such is the case.

I am indebted to Miss Euphan Maxwell for obtaining the photograph from the Registrar of the Royal College of Surgeons in Ireland, and to the latter for permission to reproduce it.

ON THE MOVEMENT OF THE INTRAOCULAR FLUID AS TAUGHT BY THEODOR LEBER

BY

PRIESTLEY SMITH, Sen.

BIRMINGHAM

MANY ophthalmic surgeons must, I think, have been perplexed or even seriously disturbed by the vigorous attack on Leber's teaching made of late years by certain well-known physiologists in Germany and France. Others will probably now be so by the revival of it in Duke-Elder's important monograph "The Nature of the Intraocular Fluids." To abandon one's old belief in a slow continuous movement of fluid from the ciliary processes, forward

through the pupil, and outward at the angle of the anterior chamber, would be to lose a rational explanation of morbid conditions that are met with every day. If the belief is wrong of course it must go at any cost, and much of our modern ophthalmology must be rewritten, but I think the dissentients have not proved their case.

Leber held that the ciliary processes emitted fluid because the pressure of the blood in their capillaries was higher than that of the fluid in the chambers, and that Schlemm's canal and the associated veins absorbed it because the blood-pressure in these vessels was lower than the chamber-pressure, in short, that the fluid was slowly renewed by simple filtration due to hydrostatic pressure. He supposed that Schlemm's canal was safeguarded against collapse by its position in the sclera. This view was generally accepted and held for many years without demur, but when the iris veins were shown to take part in the removal of the fluid a difficulty arose of which Leber himself was well aware. In 1906 he wrote: "Whether and how these veins can possibly have a blood-pressure lower than the chamber-pressure, and yet not suffer compression of their lumen, needs further explanation."[1] So far as I know he did not himself answer the question: he did not recognize that the iris veins might take up fluid from the chamber even though their blood-pressure was higher than the chamber-pressure—which it certainly is.

The answer lay in the osmotic pressure of the blood. Ten years earlier (1896) Starling[2] had shown: (1) that a one per cent. salt solution injected into the limb of an animal so as to cause oedema is freely absorbed by blood plasma moving through the vessels of the limb; (2) that when the solution and the plasma are separated by a thin animal membrane outside the body, the plasma absorbs the fluid until a pressure-difference of 25-30 mm. Hg is reached; and (3) that when a greater difference is artificially established, fluid passes through the membrane in the opposite direction. It was long, however, before these important findings were applied to the physiology of the aqueous. Only a few of the many notable workers on this subject can be mentioned here.

Since 1904 Otto Weiss[3] has maintained that Leber's teaching was at fault in its disregard of osmotic pressure—and in other ways. Hertel (1914),[4] by injecting various solutions into the blood-stream, showed that the production and absorption of the aqueous, as manifested in the tension of the eye, could be greatly influenced by altering the composition of the blood. Seidel,[5] an ardent supporter of Leber and a highly skilled experimenter, has admitted (1919) that osmotic pressure plays a part in the renewal of the aqueous. Lehmann and Meesmann (1924),[6] studying the osmotic changes that occur between blood and aqueous in normal

and abnormal conditions, found a redistribution of constituents agreeing with the osmotic principle, and therewith explained a fact inexplicable by the filtration theory, *viz.*, that the aqueous contains a higher percentage of chloride than does the blood. Duke-Elder,[7] as readers of this journal know, has still more recently (1926-27) reinvestigated by extremely delicate methods both the osmotic changes and the blood-pressures in the eye. Reference to a host of other workers on the subject is given in his articles.

No one, I suppose, now doubts that Leber's teaching as to the nature of the renewal process was defective in so far as it took no account of the absorbent power of the blood, but certain physiologists have gone much further than this in the way of dissent.

Professor C. Hamburger concluded from various experiments of his own that there was no forward movement of fluid through the pupil; that a "physiological barrier" against such movement existed at the pupil; that the fluid in the posterior aqueous chamber differed widely from that in the anterior; and that the fluid in the anterior chamber came from the iris, not from the processes.

Professor O. Weiss[8] in a recent article has restated the objections that he and others have brought against Leber's teaching in detail, and has declared it as a whole to be unproved and obsolete. In particular he holds that movement of the fluid through the pupil is not proved; that its production by one group of vessels and absorption by another is not proved; and that its renewal, in so far as this occurs at all, is effected by dialysis throughout the whole of the intraocular vascular system.

Duke-Elder[9] deals with the subject comprehensively and is largely in agreement with Weiss. He holds that the prevailing view as to the formation and circulation of the aqueous is wrong; that the fluid is neither a secretion nor, in the accepted sense, a transudate from the blood; that it is a dialysate; that it does not circulate actively through the eye, being in osmotic equilibrium with the capillary blood, but that it is subject nevertheless to a minimal and intermittent circulation induced by muscular movements. His position is not quite definite for towards the end of the work (p. 108) he writes: "It would seem, however, that the existence of a circulation, as elaborated by Leber, cannot altogether be denied," while on the following page one reads: "On either side of the capillary walls there is a balancing hydrostatic and osmotic pressure-equilibrium," a condition which, as he says elsewhere (p. 72), must render the fluid "essentially stagnant."

The question of chief interest to the clinical worker is whether the fluid does or does not move slowly and steadily along the path

described by Leber, and I think it may be raised even by an ex-clinician who knows nothing of modern bio-chemistry. Questions of chemical affinity, molecular concentration, and electric currents are not in dispute here; I do not presume to doubt the findings of experts in these subjects—though I notice that they do not always quite agree. My point is that the alleged stagnation of the intraocular fluid is not proved by the facts put forward, and is contradicted by a mass of valid evidence. If in the wrong, I hope at least to elicit some further explanation.

Two forces have to be considered: the *osmotic*, which alters the constitution of the fluids in subtle ways and tends to cause movement in bulk *from the chambers, through the wall of the vessel, into the blood-stream;* and the *hydrostatic*, which tends to cause movement in bulk *in the opposite direction*. When these forces are exactly balanced there is no transit of fluid in either direction, but there is a difference of hydrostatic pressure on the two sides of the membrane representing exactly the difference of osmotic force in the two fluids. The fluids are then in *osmotic equilibrium*.

The dissentients hold that the aqueous and the capillary blood are in osmotic equilibrium, with slight alternating variations from it in both directions (Duke-Elder), and their argument, if I understand it, is this. Minute examination of the chemical conditions of the fluids indicates such equilibrium; the difference between their hydrostatic pressures, though not exactly measurable, lies within limits that are compatible with such equilibrium; therefore the equilibrium exists. The conclusion seems hardly safe.

By wonderfully delicate methods Duke-Elder has made fresh measurements of the blood-pressure in certain arteries and veins within the eye, but like Henderson and Starling when they dealt with the question twenty years ago, he can only state the capillary pressure as lying within certain limits. He assumes it to be just high enough to establish osmotic equilibrium, which implies stagnation of the fluid in the chambers. But if we choose to assume it to be slightly above the equilibrium point in one region of the eye, and slightly below it in another, we at once account for the slow steady movement of the fluid through the chambers which Leber described and most of us believe in.

Is there any sufficient reason against this alternative assumption? Certain facts seem to drive one to it. The blood-pressure is higher in the ciliary capillaries than in Schlemm's canal and the iris-veins, while the aqueous pressure hardly differs in the two regions; it is difficult therefore to see how osmotic equilibrium can exist in the two regions at the same time. The departure from equilibrium in the two directions may be very small, for the movement of the fluid—as we believe it to occur—is very slow.

To speak of the movement as a *stream* through the chambers is to create a false impression. Take the escape from the chamber to be 5 cmm. per minute—Leber's original estimate—and to be equally distributed around the circumference; take the circumference to be 35 mm., and the depth of the visible chamber at its margin 1 mm.; then the rate of movement outward at the margin will be one-seventh of a millimetre per minute, or one four hundred and twentieth per second—a movement much slower than that of the long hand of an ordinary watch. Assuming the surface of the iris to remove some of the fluid the movement will be slower still. It will certainly not be discoverable even with the slit-lamp on watching the movement of particles suspended in the aqueous; it will be completely masked by the much more rapid movement due to thermal currents.

Another suggestive fact—which I learn from Duke-Elder's work—may be noted here: blood in the venous state has a considerably higher osmotic pressure than in the arterial state.

Those who deny that the fluid moves continually in a certain direction rely at present, if I am not mistaken, chiefly on the supposed osmotic equilibrium of the blood and the aqueous, but other arguments are still put forward. Let us glance at these and then turn to the evidence in favour of the movement.

Hamburger's various objections have been met one after the other by Seidel,[10] who has shown, conclusively as it seems to me, that they rested largely on inadequate experiments.

To test the alleged difference between the fluid in the posterior aqueous chamber and that in the anterior, Seidel first determined the relation of refractive index to albumen percentage in many specimens of normal and abnormal aqueous. Then, with the refractometer, he compared small samples taken with all possible avoidance of disturbance from the two chambers of the same eye, in cats and rabbits in slight ether-narcosis. The fluid was identical in the two chambers and when vitiated by increase of albumen after vascular disturbance of various degrees it was equally vitiated in both.

To study the supposed retention behind the iris of coloured fluid injected in small quantity into the posterior aqueous chamber, he watched for the appearance of the colour in the pupil with the slit-lamp. It appeared in one to five minutes, whereas under the weaker illumination used by Hamburger it did not appear until much later. No "physiological barrier" was discovered.

To observe the advent of colour in the ciliary processes and iris of rabbits after systemic injection of coloured fluids, Seidel used albinos instead of pigmented subjects, and moderate doses of isotonic solutions instead of larger and more concentrated doses. The processes (which are attached to the back of the iris in the rabbit, and are seen through it in the albino) displayed its presence sooner than did the iris proper. They were not "refractory" to its reception, but the reverse.

Seidel's[11] observations as to the relative activity of the iris-veins and Schlemm's canal in the absorption of the aqueous are important. They seem to prove that whereas the blood-pressure in the iris is a little higher than the chamber-pressure, that in the episcleral veins is a little lower, and accordingly that fluid passes from the chamber more freely into the canal than into the iris.

In living rabbits a fine syringe half filled with coloured solution was introduced into the anterior chamber while the pressure in the latter was controlled with a Schiötz tonometer. A small quantity of normal aqueous was drawn into the syringe and immediately became mixed with the colour solution; without disturbance of the needle it was then returned to the chamber in sufficient quantity to restore the previously ascertained chamber-pressure. The episcleral veins were watched for change of colour. Under normal chamber-pressure, and even under slightly sub-normal they showed the alien colour; when the chamber-pressure was considerably sub-normal they recovered their blood colour.

I now turn to evidence that points more directly to a continuous forward movement of the fluid.

The well-known experiments of Nuel and Benoît[12] on two healthy human eyes doomed to excision by reason of orbital growths gave striking evidence of a current—under artificial conditions. Chinese ink was used because insoluble particles in suspension are better for the purpose than coloured solutions; they do not travel by diffusion but move with the fluid until they are filtered out of it by the membranes through which the fluid passes; the microscope shows where this happens.

A drop of filtered Chinese ink was injected into the vitreous two and a half hours before excision in one case, five hours in the other. After excision the natural pigment was bleached so that it could not be mistaken for ink particles. The larger particles were held back by the hyaloid, the smaller passed through it into the posterior chamber. Here they found no entrance into the free surface of the ciliary body or into the posterior surface of the iris. Passing through the pupil into the anterior chamber the particles entered the anterior surface of the iris freely through large crypts at its base and near to the pupillary edge, massing themselves around the iris-veins. They were massed also in the angle of the chamber, outside Schlemm's canal on the side nearest to the chamber, and around the veins that pass through the ciliary muscle and the larger veins connecting the iris and processes with the vortex veins (see the illustration in the original paper, or in Parsons' Pathology, p. 992).[13]

It may be reasonably objected that the current thus demonstrated was not pre-existent but merely generated by the injection. The authors say that the amount injected was "hardly a drop" and that it caused "no sensible hardening of the eye." Gifford (1886)[14] in similar experiments on animal eyes allowed some vitreous fluid to escape through a puncture before injecting the ink, and still found evidence of the forward current. This does not completely answer the objection, for the intraocular pressure was certainly disturbed, but at least the experiments clearly showed the paths along which the fluid escapes most easily from the eye.

No such objection can be raised to Ulbrich's[15] well-known observations on an intact living human eye.

The iris presented, in addition to a free pupil, a small congenital aperture, closed by a thin flaccid membrane. When the eye and lids were at rest the membrane bulged forward like a tiny blister. Forcible closure of the lids drove it back making it markedly concave. Accommodation did the same. In each case it recovered its previous position regularly in about thirty seconds, and in the case of accommodation this took place though the accommodative effort persisted. Pressure on the cornea drove it back in like manner, but recovery was instantaneous when the pressure ceased. Alteration of the pupil under influence of light, and dilatation by euphthalmine, did not interfere with the phenomenon.

If we imagine the fluid to move slowly forward and to meet with a slight resistance in passing between the iris and the lens, the explanation of this case is simple. Because of that resistance the pressure is slightly greater in the posterior chamber than in the anterior, and the membrane consequently bulges forward so long as the pressures are not disturbed. Strong closure of the lids reverses the pressures by suddenly pressing on the globe and

forcing a little extra fluid through the pupil into the anterior chamber, and so renders the membrane concave. The normal current restores it to its usual position in a definite time. Accommodative effort carries the pupillary zone of the iris forward on the surface of the lens while the peripheral zone is pushed backwards by the displaced aqueous (Helmholtz). Therewith the membrane becomes concave, but recovers its position as before in spite of continued accommodation. After pressure on the cornea recovery is instantaneous because no fluid has been driven through the pupil. It is difficult to see what other explanation could be given.

Again certain morbid conditions of the eye bear witness to the continuous movement of the fluid, or to obstruction of its movement. Outline sketches of a few typical examples will be enough to show their significance.

A small melanosarcoma of the iris, of some years standing, demands excision of the eye. Cells cast off by the tumour are shown by the microscope to be lodged in the tissues around the angle of the chamber throughout its whole circle—like the ink-particles in the injection-experiments, but not carried thither by an artificial current of fluid.

Through chronic mild iritis the pupil margin becomes adherent throughout its whole circle to the lens capsule. The rest of the iris bulges forwards, being displaced by fluid collected behind it; a secondary glaucoma ensues. A timely iridectomy restores a channel from the posterior to the anterior chamber; the bulge subsides at once; the tension falls; the eye is saved.

A lens imperfectly attached from birth becomes completely detached many years later. One day, while the head is bent over the washing-basin, the lens passes into the anterior chamber. Pain and high tension quickly follow and advice is sought. The whole pupil is seen through the lens; the peripheral zone of the iris is in contact with the cornea, being driven forward around the lens margin by pressure of fluid imprisoned behind it. Before operation can be undertaken the lens passes back through the pupil; pain and tension quickly subside. The same displacement recurs several times, each time with a secondary glaucoma, and spontaneous recovery. At last, with special precautions against falling backwards of the lens at the moment of operation, the lens is removed and no further glaucomatous attacks occur.(16)

As in the previous case, a detached lens passes into the anterior chamber but does not occlude the pupil completely; a free space remains between its upper edge and the pupil margin. The peripheral zone of the iris is not pushed forward; there is little discomfort and no injection. There is no secondary glaucoma. In a case similar to the foregoing, there is no rise of tension until, in preparing for operation, eserine is used to prevent the lens from falling back through the pupil. Then, the pupil being contracted and completely behind the lens, secondary glaucoma supervenes.(17) A lens which is rough, shrivelled, and chalky-looking as the result of injury received years previously, falls into the anterior chamber. It is too small to occlude the pupil. Some pain follows the dislocation for a few days, but soon subsides. Eighteen months after the dislocation tension is still normal. There has been no secondary glaucoma. The lens is extracted with good result.

Inference.—Secondary glaucoma after dislocation of lens into anterior chamber is due to obstruction in path of fluid, not to inflammation.

The evidence pointing to *production* of the fluid by the ciliary processes is of various kinds and too well known to need detailed description. First, we have their structure, and their position in relation to the chambers; secondly, the comparative ease with which diffusible colouring matter in the blood passes from their capillaries into the chambers; thirdly, the lack of fluid that results from their

experimental removal (Deutschmann), or from the cutting off of their special blood supply (Wagenmann) and the comparative non-effect of removal or absence of the iris, and of arrested blood supply to the choroid, or retina, or both; and lastly, the effects on the production of the fluid produced by cyclitis on the one hand, and by choroiditis, retinitis, or iritis on the other.

To show that the angle of the chamber provides for *continuous removal,* and that obstruction here overfills the eye with fluid, one might, if necessary, cite various types of glaucoma. It is true that the most conspicuous type of all, acute primary glaucoma, still awaits full explanation of one feature—the advance of the lens at the time of the attack—but it is impossible I think, for the high chamber-pressure of acute glaucoma to occur otherwise than by hindrance at the main outlet.

To this substantial mass of evidence, most of which is far from new, no satisfactory answer has been given. In his recent review of the matter Weiss[8] does not meet even that which comes from the physiological laboratory. He recalls the objections raised by Hamburger but gives no account of their refutation by Seidel. The clinical evidence fares little better. We are told that the Ulbrich case can be explained without recourse to continuous movement of the fluid, but not exactly how. The *iris bombé* argument is met by saying that total adhesion of the iris to the lens is not always followed by secondary glaucoma—which of course is true, for it is often associated with destructive iridocyclitis—but no explanation is given of the secondary glaucoma that does occur, or of its subsidence when an aperture is made in the iris.

It seems to me that the dissentients, relying on the findings of physico-chemistry, attach too little weight to clinical observation: that their attitude for the most part is too exclusive. Thus Weiss attributes the renewal process wholly to molecular force, and looks to the bio-chemistry of the future to explain what cannot yet be explained on that basis; he neither admits nor denies a continuous movement of the fluid. Magitot[18] entirely denies the existence of such movement. Duke-Elder begins his valuable treatise with a strongly subversive argument, but later makes considerable concession to old beliefs.

Subject to correction, I submit that we are fully justified in maintaining that under the influence of two opposing forces the fluid moves slowly and continuously through the chambers: that the ciliary capillaries emit the fluid because their blood-pressure is high enough to overcome the osmotic force, while Schlemm's canal and the iris veins absorb it because here the blood-pressure is lower and the osmotic force prevails.

Leber's teaching as to the nature of the renewal process was weak at one point no doubt—it paid no heed to the absorbent power of the blood; but as to *the source, the path, and the exit* of the fluid it stands, I think, unshaken and invaluable.

REFERENCES

1. **Leber und Pilzecker.**—Neue Untersuchungen, etc. New researches on the fluid interchange in the eye. *Arch. f. Ophthal.*. Bd. LXIV, 1906.
2. **Starling.**—*Jl. of Physiol.*, Vol. XIX, 1896.
3. **Weiss, O.**—Die Ernährung, etc. The nutrition and circulation of the eye. *Nagel's Handbuch der Physiol.*, 1904.
4. **Hertel.**—The dependence of the intraocular pressure on the composition of the Blood. *Arch. f. Ophthal.*, Bd. LXXXVIII, H. 2, S. 197, 1914.
5. **Seidel.**—*Arch. f. Ophthal.*, Bd. CI, S. 403 (foot-note), 1919.
6. **Lehmann and Meesmann.**—*Pflüger's Arch. f. Physiol.*, Bd. CCV, S. 210, 1924.
7. **Duke-Elder.**—Intraocular and osmotic pressure. Ocular circulation. *Brit. Jl. of Ophthal.*, Vol. X, pp. 1 and 513, 1926.
8. **Weiss, O.**—Herkunft, und Schicksal, etc. Source and destination of the intraocular fluids. *Deutsch. med. Wochenschr.*, SS. 21 and 63, Jan., 1925.
9. **Duke-Elder.**—The nature of the intraocular fluids. Monograph Supplement to *Brit. Jl. of Ophthal.*, 1927.
10. **Seidel.**—Experimentelle Untersuchungen, etc. Experiments on the source and movement of the intraocular fluid. A series of articles in *Arch. f. Ophthal.*, 1918-1921.
11. **Idem.**—Bd. CIV, H. 3, S. 357.
12. **Nuel and Benoit.**—*Arch. d'Ophtal.*, T. XX, 1899.
13. **Parsons.**—Pathology of the Eye, p. 992.
14. **Gifford.**—The direction of the lymph-streams in the eye. *Arch. of Ophthal.*, p. 153, 1886, and *Ophthal. Rev.*, p. 270, 1886.
15. **Ulbrich.**—*Rep. of Ophthal. Soc.* Heidelberg., Meeting of 1907, p. 105.
16. **Priestley Smith.**—Glaucoma, its causes, etc. London: Churchill, 1879. Cases of dislocation of lens into anterior chamber, p. 183 and pp. 262-5.
17. **Minor, J. J.**—*New York Med. Jl.*, p. 194, 1881.
18. **Magitot.**—*Ann. d'Ocul.*, Vol. CLIV, 1917.

VISUAL FIELD CHANGES IN PREGNANCY

BY

H. M. TRAQUAIR

EDINBURGH

THOSE who have been sceptical as to the production of bitemporal hemianopia by pressure on the chiasma by the physiologically enlarged pituitary body in pregnancy will welcome Dr. Abramowicz's paper in the January issue of the BRITISH JOURNAL OF OPHTHALMOLOGY. In 81 pregnant women Dr. Abramowicz found only five who showed "slight temporal contractions of the visual fields" and this feature he cautiously—and wisely—considers "*may* be occasioned by the hypertrophy of the pituitary body"

(italics, the present writer's). Is it not possible that a closer scrutiny and a fuller consideration might dispose of even these five cases?

Recent interest in the question of bitemporal hemianopia in pregnancy dates from the Washington Congress in 1922, when Finlay[1] published his results, which were supported by those of Maud Carvill.[2] These observers found respectively that 71 per cent. and 89 per cent. of pregnant women showed bitemporal contraction of the fields in the ninth month. At the Washington meeting, de Lapersonne remarked: "Dans les champs visuels qui sont presentés tous n'ont pas les dispositions caractéristiques de l'hémianopsie bitemporale." This remark, which goes to the root of the matter, was allowed to pass without comment.

One may without hesitation go further than this and say that no fields from cases of uncomplicated pregnancy have yet been published which show the characteristic features of bitemporal hemianopia, even in its earliest stages.

Abramowicz states that the subject of his investigation was "the contraction of the outer limits of the visual field" and refers to "slight contraction upwards and outwards" as an early symptom of chiasmal lesion. Other writers upon the fields in pregnancy have worked mainly upon the same lines and, without first laying down as an essential premise a clear definition as to what constitutes the perimetric evidence of hypophysial pressure upon the chiasma, have not hesitated to formulate positive conclusions on the basis of field changes which differ in important particulars from those present in cases of known pituitary enlargement.

What then are the characteristic features of early bitemporal hemianopia from this cause?

Cushing, than whom no better authority could have been selected, is quoted, but Cushing's words[3] are "Stage 1 shows merely an upper temporal quadrantal defect in the colour field often with a slight slanting off of the form fields in the same quadrant." That is to say, the essential early change is not detected at the periphery of the field, but well inside the periphery, though an early peripheral change *may* also be demonstrable. Walker, who was responsible for the perimetry in Cushing's clinic, observes that "colour defects are practically always represented by form defects, if the visual angle is made small enough."[4] He also states definitely that "For the detection of early pressure effects on the optic tract examination of the fields for the smallest visual angles gives the most reliable results."[5] These findings agree with my own observations[6] and show that in early bitemporal hemianopia from upward pressure against the chiasma visual acuity over the greater part of the upper outer

quadrant is depressed, and that this impairment is demonstrable by perimetry first in the interior of the quadrant and later, when more advanced, at the periphery in addition.

Abramowicz did not test the interior of the field with small visual angles, basing his opposition to this method on the statements of Hess,[7] to which Köllner[8] refers. Hess's objections are purely theoretical and, presuming that the perimetrist possesses an average amount of common sense, have no weight in practice, while Köllner[9] himself praises Bjerrum's screen which he states is, "in association with the perimeter, a valuable and indispensable means for the detection of fine, or commencing field defects." While, partly at any rate, adopting Cushing's evidence as to the early signs of bitemporal hemianopia, Dr. Abramowicz apparently mistrusts the method of perimetry used in Cushing's clinic, although this, the quantitative method of Roenne and Bjerrum, has yielded invaluable and unquestioned additions to our knowledge of the field defects due to enlargement of the hypophysis.

In none of the five cases reported is an "upper outer quadrantal defect of the colour field" mentioned either with or without a corresponding "slight slanting off of the form field in the same quadrant." In number 23, the contraction of the colour field (green) was concentric; in number 58, there was bilateral "out-upward" contraction of the field for white but the state of the colour fields is not mentioned; in the other three, there was "temporal contraction" for red and green; in number 53, for green only on both sides; in number 54, for both colours on the left side only; in number 14, for both colours, whether uni- or bilateral is not mentioned.

Now, field changes which can be demonstrated by so large a visual angle as 5/300 (57′), the angle used in these investigations, are relatively gross, *i.e.*, they indicate a severe depression of visual acuity in the area affected. Defects of this intensity, limited to the periphery of the field, and unassociated with a quadrantal defect of the colour field or associated only with concentric contraction for colour, have not hitherto been observed in the initial stages of bitemporal hemianopia. Moreover, "temporal contraction" for colour, if by this is meant a contraction along the horizontal meridian, affecting approximately equally both upper and lower temporal quadrants, is a very unreliable indication of organic lesion, more especially if green is the colour used, unless strongly supported by confirming tests, and in any case has never been shown to be an early sign of pressure on the chiasma.

If bitemporal hemianopia due to pregnancy exists, the field changes might naturally be expected to correspond to the earliest changes demonstrable in cases of pituitary tumour, *i.e.*, normal

periphery with a quadrantal change easily demonstrable by coloured or small white objects in the region 10° to 40° from the fixation point.

The absence of scotoma is another feature which requires explanation. In typical bitemporal hemianopia due to pituitary tumour a scotoma is always present in the central part of the upper outer quadrant, unless the hypophysial enlargement has been very slow as in the usual type of chronic acromegaly. If the pituitary body in normal pregnancy really enlarges to the extent required actually to press upon the chiasma, the growth must be fairly rapid, and one would expect to find, not only the scotomatous type of hemianopia, but also headache from the irritation of the nerves of the diaphragma sellae.

It seems, therefore, very doubtful, to say the least, whether the five cases in question present any features indicative of bitemporal hemianopia from pituitary pressure, and, having regard to the cautious way in which his conclusions are expressed, it is possible that this view may not be altogether surprising or unwelcome to Dr. Abramowicz himself.

If the study of the characters of these field changes gives negative results as regards the hypophysial pressure hypothesis, it affords ample positive evidence of their psychical origin, which is the alternative explanation. Psychical or functional field changes, manifested by perimetric examination, have their own distinctive characters, and the charts published by Finlay and Carvill, for example, suggest this origin very strongly. No special tests, essential in the circumstances, to exclude functional changes are mentioned in their reports.

The contraction is temporal rather than supero-temporal, affecting the lower as well as the upper quadrants. While the nasal fields were often contracted also, the colour fields were sometimes concentrically restricted. Carvill found the edge of the field quite sharp, as is so characteristic of psychical defects and so unusual in pressure bitemporal hemianopia, but does not state how this feature should be interpreted.

Temporal restriction of the field is quite a common form of psychical defect, it is a milder form of the same impairment which, when more fully developed, appears as an approximately circular concentric contraction. As the gradient of perception in the field, from maximum at the visual axis to zero at the periphery, is more sloping on the temporal than on the nasal side, the defect is likely to be more easily demonstrated by perimetry on the temporal side.

That these field changes are of psychical origin was pointed out by Bellinzona and Tridontani and no evidence has hitherto been produced which impairs the validity of their view.

REFERENCES

1. **Finlay.**—*Intern. Cong. Ophthal.*, Washington, D.C., U.S.A., p. 144, 1922.
2. **Carvill.**—*Ibid*, and also *Amer. Jl. Ophthal.*, Series 3, Vol. VI, p. 885, 1923.
3. **Cushing and Walker.**—*Brain*, Vol. XXXVII, p. 349, 1915.
4. **Walker.**—*Arch. of Ophthal.*, Vol. XLVI, p. 540, 1917.
5. **Idem.**—"Colour interlacing and perimetry,"—*Trans. Amer. Ophthal. Soc.*, 1916.
6. **Traquair.**—*Edin. Med. Jl.*, Sept., 1913; *Ophthal. Rev.* p. 72, 1914; *Brit. Jl. of Ophthal.*, April-June, 1917.
7. **Hess.**—*Arch. f. Augenheilk.*, Bd. LXXXIV, S. 1, 1919; *Ibid*, Bd. LXXXV, S. 1, 1920.
8. **Köllner.**—"Die Untersuchungsmethoden." *Graefe Saemisch*, Bd. III 3 Aufl., 1925.
9. **Idem.**—*Loc. cit.*

OBSERVATIONS ON THE COMPLICATIONS FOLLOWING 4,000 CASES OF CATARACT EXTRACTION

BY

M. M. CRUICKSHANK, MAJOR, I.M.S.

THESE cases represent a part of the work done by Dr. Holland of Quetta, and his staff, during the 1923, 1924, and 1926 seasons at Shikarpur, Sind. The season commences on the first of January and closes at the end of the third week in February. During these three seasons 4,027 cases of cataract were dealt with, 1,322, 1,455, and 1,250 in the respective seasons. While a more or less equal share of the operative work falls to each surgeon, the work of the out-patient department is largely controlled by Dr. Holland, because of his intimate knowledge of the various languages spoken. To me fell the care of the patients in the wards, and I was afforded the unique opportunity of closely examining all the eye cases, noting complications and registering visual results. A system, simple yet effective, was devised whereby everything pertaining to a cataract case could be noted. Each patient on entering the operating theatre had his name written in the cataract book and numbered. Particulars were noted with regard to tension, operative procedure followed, and any complications occurring during the operation. These points, noted in the cataract book were later transcribed to small notebooks used in the wards, the patient's serial number in the cataract book being the number of the page in the small books, containing all the facts relating to the case. It was team work, each member of the team doing his best to make the records as complete and accurate as possible by seeing that the slightest complication, occurring during the operation, however trivial it might appear to himself, was entered against the patient's number and name in the cataract book.

With regard to the selection of patients and the choice of

operation a word must be said. Patients come long distances by rail and bullock cart, and for many to repeat such a journey is out of the question. In the interests of such patients risks must be taken, which in more favourable circumstances would not be incurred.

The choice of operation.—Though a strong advocate of the intracapsular method, Holland is convinced that it is not necessarily the operation of choice in every case. To the three classes : juvenile, congenital, and secondary cataracts, which Smith considers as unsuitable for the intracapsular operation, Holland[1] adds five :

(1) The "ox eye" type : the very prominent eye found in full-blooded, plethoric individuals, in which vitreous prolapse is liable to occur.

(2) Those cases of double cataract in black-haired, healthy men, aged 35 to 50 years, in whom the zonular fibres are very resistant and require a pressure for their rupture, which leads to vitreous loss.

(3) Those cases of glaucomatous cataract and of cataract in glaucoma, in which a preliminary iridectomy is advised, the lens being extracted with capsulotomy three weeks to twelve months later.

(4) Cases of traumatic cataract.

(5) Those cases where ordinary, legitimate pressure fails to dislocate the lens.

Would there be any advantage in encouraging those lenses to tumble, which resist ordinary pressure and are difficult to dislocate? That was the question asked during the 1923 season, but attempts to tumble hard cataracts meant in the majority of cases loss of vitreous. Some experience with Barraquer's technique during 1924 persuaded me that the answer to the question was, yes, because it was clearly demonstrated that, when the lens was tumbled in phacoerisis, two serious complications, vitreous loss and iris prolapse, tended to be eliminated. If the object of tumbling the lens in phacoerisis is the elimination of these complications, then the initial movement with the erisiphac, which I have described[2] is important. If vitreous loss is to be avoided then the zonular fibres ought to be ruptured from below. The problem awaiting solution was, how to effect this by Smith's method of expression in the capsule. With this problem in his mind Colonel Smith visited India during the winter of 1925-1926 and while there evolved his new technique for the expression of the cataractous lens in its capsule by external pressure alone.[3]

In the minds of those who saw Colonel Smith operating by his new method and had the opportunity of putting the method to the test, no doubt remains that the hard lens can be tumbled without loss of vitreous.

Of the 4,027 cases which form the basis of this report 3,639 were expressed in the capsule by Smith's methods; 214 by Barraquer's method; 174 with capsulotomy, *i.e.*, 90.3 per cent., 5.3 per cent., and 4.3 per cent. respectively. It is not my intention to compare these methods, because in a clinic where the intracapsular operation is done and only difficult and complicated cases are reserved for capsulotomy, any comparison would be obviously unfair. I desire rather to note how slight alterations in technique tend to increase or decrease certain complications. The percentage results do not necessarily refer to the combined series, and where this is not so the number of cases dealt with is noted and thus any alterations in technique can be judged as having had a fair trial or not so far as numbers are concerned.

Tables giving a Summary of Results

A. Complications occurring during the operation:

	Per cent.
Vitreous loss, following the lens	9.38
Vitreous loss, preceding the lens	0.68
Burst capsules	6.23
Spoon deliveries	2.34

B. Complications occurring after the operation:

	Cases.	Per cent.
Iris prolapse, slight	226	5.63
Iris prolapse, requiring treatment	57	1.41
Iris incarcerated in the wound	192	4.76
Iritis, serous	153	3.79
Iritis, plastic	27	0.67
Keratitis with pannus formation	12	0.29
Everted corneal flaps	7	0.17
Post-operative glaucoma	4	0.10
Choroidal haemorrhage	55	1.36
Sepsis	64	1.58

C. Reasons for non-improvement in vision:
i.e., V.=hand movements or less.

1. Attributable to the operation.

	Cases.	Per cent.
Sepsis	64	1.58
Choroidal haemorrhage	55	1.36
Plastic iritis	27	0.67
Burst capsule with cortical remains ...	27	0.67
Vitreous loss	14	0.34
Keratitis	9	0.22
Eversion of the corneal flap...	7	0.17
Post-operative glaucoma	4	0.10
Total	207	5.11

2. Not attributable to the operation.

Corneal opacities	42	1.04
Choroido-retinal changes	17	0.44
Vitreous opacities	13	0.32
Optic atrophy...	8	0.20
Low tension eyes	6	0.14
Retinitis pigmentosa...	5	0.12
Strabismus	4	0.10
Total	95	2.36

Vitreous Loss

Though the percentage of vitreous loss is high, 10 per cent., the amount lost was considerable in only a few cases. This is borne out by the fact that in only fourteen cases or 0.34 per cent., was non-improvement in vision associated with vitreous loss. In most it amounted to very little and followed the lens. In those cases, 0.68 per cent., where vitreous was noted as appearing in the wound before the lens presented the delivery was aided with the spoon. In how far small amounts of vitreous loss may affect the visual acuity in after years is one of the many end result problems still unsolved. Major Wright[4] considers as potentially lost, an eye in which vitreous has prolapsed, while Colonel Lister[5], who critically examined 98 of Smith's cases two or three years after operation, concluded that the vision of those cases, in which vitreous had prolapsed, eventually became much better than could have been expected at the time of their leaving hospital. He pointed out that with vitreous loss there is a greater distortion of the cornea temporarily, and that tension and conditions of circulation and nutrition take longer to become re-established than when vitreous is not lost, and further, that in intracapsular operations the loss is less serious than in capsulotomy operations, where the vitreous gets mixed up with lens matter.

Hari Shankar[6] of Muthra describes a method of preventing vitreous escape in the intracapsular extraction of cataract in prominent eyeballs. He states: "if both fornices are exposed to view when looking from the side, the assistant has efficiently managed the lids and the eyebrow, and vitreous should not escape." To avoid vitreous escape he places a small pledget of moist wool on the exposed eyeball, exerting gentle pressure backwards on the globe for about one minute, or, as he puts it, "whilst you mentally count two hundred." This should cause no pain to the patient. He finds that by so doing, "the danger of expulsive haemorrhage is diminished when the tension is plus

and the *vis a tergo* of the vitreous is absent or is reduced considerably."

Is vitreous prolapse more liable to occur in the simple or in the combined operation? One would imagine that the slight increase of pressure required to express the lens through a normal or a semi-dilated pupil would lead to increase of vitreous loss, while on the other hand one might consider that the support of a complete iris diaphragm would tend to decrease such loss.

The following figures are interesting, but considering the many factors which tend to bring about vitreous loss, too much importance should not be attached to them.

	Cases.	Vitreous lost in.	Per cent.
Complete iridectomy	650	85	13.08
Marginal iridectomy	144	0	—
Peripheral iridectomy	216	17	7.87
No iridectomy	240	19	7.91

The marginal iridectomy was devised by Colonel Smith and the majority of these cases were done by his son, Dr. J. R. Smith. The pupillary margin of the iris is picked up with a fine iris forceps, and holding the iris scissors parallel with the corneal wound a small piece of iris is removed. Stress is laid on the point that the piece of iris margin removed must be such that the sphincter muscle is not cut through completely, otherwise there is danger of the iris splitting radially as the lens passes through the pupil. It is noteworthy that in no single instance where marginal iridectomy was performed did vitreous escape. Comparing the 650 cases in which a complete iridectomy was done, with the 600 cases in which marginal or peripheral iridectomy or no iridectomy was done, the percentage of vitreous loss in the former amounted to 13.08 per cent. as compared with 6 per cent. in the latter.

Iris Prolapse

Prolapse of the iris is a serious and worrying complication, requiring, as it may, further operative measures for its treatment. The smallest prolapse is a potential source of danger and a source of pain and discomfort to the patient. Minute attention to the replacing of the edges of the coloboma, all important as this is, will not eliminate the trouble. The prolapse may occur after the bandage has been applied, due, in all probability, to the patient squeezing his lids, the escaping aqueous sweeping the iris, or, if an iridectomy has been performed, the edges of the coloboma into the wound.

Maynard[7] advised the use of atropine, both before and after the extraction, but noted that full dilatation of the pupil was not

maintained after the section of the cornea had been made, and stated that atropine could not take the place of iridectomy.

Maynard held that atropine acted by stimulating the radiating fibres of the iris more than by paralyzing the sphincter, the iris being held taut by the radiating fibres drawing on the pupillary margin from all sides and thus rendering prolapse difficult. Also a wide pupil provides a sluice through which the aqueous escapes readily from the posterior to the anterior chamber, the two chambers being almost thrown into one.

In order to obtain maximal dilatation of the pupil, G. F. Alexander[8] instils one drop of a 5 per cent. solution of atropine one hour before operation. He claims that by so doing iris prolapse is less frequent.

Eserine may be of value in the prevention of iris prolapse on account of its stimulating action on the sphincter pupillae, but I cannot say that I have seen a pin-point pupil result from its use after the extraction of the lens. The semi-dilated, sluggish pupil, however, constitutes a danger and I would prefer a pupil fully under the influence of atropine.

Barraquer uses eserine but in addition makes use of a conjunctival flap and suture.

A conjunctival flap and suture are of definite value. If iris prolapse is to be prevented the suture or sutures must be carefully placed to ensure accurate coaptation of wound edges and thus prevent any sudden loss of aqueous while the anterior chamber is reforming. Again, is an iridectomy essential if iris prolapse is to be prevented? If Barraquer's technique is followed, the eye well under the influence of atropine, and the lens tumbled, then I am satisfied that an iridectomy is not essential. With regard to other methods there is little doubt that a marginal or a peripheral iridectomy gives better results than a complete iridectomy.

	Cases.	Prolapse.	Per cent.
Complete iridectomy	650	73	11.23
Marginal iridectomy	146	9	6.25
Peripheral iridectomy	216	15	6.94
No iridectomy	240	22	9.16
Complete iridectomy with eyebrow-lid stitch	52	7	13.46

In the peripheral iridectomy cases, the iridectomy was placed centrally, that is in the vertical meridian, in 124 cases, and laterally, that is between the vertical and the horizontal meridians, in 92 cases. In the former, iris prolapsed in eight cases, 6.45 per cent., and in the latter in seven cases, 7.60 per cent., so that the balance is in favour of the centrally placed iridectomy. In the no-iridectomy cases atropine was not used.

The eyebrow-lid stitch was a mattress suture passed through the thickness of the eyebrow including the peripheral fibres of the orbicularis. This stitch controlled powerful squeezing of the lids on the part of the patient, but did not prevent iris prolapse. Whether or not the prolapse in these cases was due to the discomfort of the stitch causing the patient to interfere with his bandage or rub his eye over or under the bandage, I cannot say.

Burst Capsules

Even if unassociated with vitreous loss a burst capsule is one of the most serious complications that can attend the intracapsular operation. By bursting the capsule the operation does not resolve itself into a simple extraction with capsulotomy, for the posterior lens capsule has been dislocated, and unless the capsule can be removed entire with the capsulotomy forceps, a very dense after-cataract will result. Even if the capsule has been removed the difficulty of milking out flocculent cortex without further loss of vitreous will be considerable, and may be impossible. It is difficult to see why the majority of burst capsules should occur when a complete iridectomy has been performed. That peripheral iridectomy should account for a certain number of burst capsules is readily understood. Should the button-hole in the iris be too large the narrow band of iris remaining will tend to cut through the capsule; especially is this so if the lens attempts to present through a large button-hole iridectomy.

	Cases.	Burst capsules in.	Per cent.
Complete iridectomy	650	41	6.30
Marginal iridectomy	144	0	—
Peripheral iridectomy	216	12	5.55
No iridectomy	240	9	3.75

The Drawn-up or Boat-shaped Pupil

The drawn-up pupil, which is so frequently seen both after expression of the cataractous lens in its capsule, and after extraction with capsulotomy, cannot be dismissed as the result of a hasty or careless replacing of the iris. Kirkpatrick[9] states that "the pupil of an eye from which vitreous escape has occurred during a cataract operation has a characteristic appearance, unless the vitreous escape has been reduced and the iris replaced. This is due to the folding back of the iris which occurs. The lower margin describes a wide curve, and the iris is seen to be shaped like a crescent, the inverted pillars of the coloboma, if an iridectomy has been made, forming the horns." Factors which tend to cause iris prolapse undoubtedly play a large part in the formation of the drawn-up pupil. Incarceration of the iris in the wound,

vitreous prolapse, a slowly forming anterior chamber, the result it may be of a bad incision or of a carelessly replaced conjunctival flap, any condition which keeps the iris in apposition with the posterior surface of the cornea in the region of the healing wound, especially should healing of the wound be retarded, by the presence between its edges of iris, vitreous, blood or capsule. But why should a pupil continue to become more and more drawn up, weeks after the wound has healed, till little or no pupil is left? It is possible that, as a result of fibroblastic activity, more so in the presence of blood, the iris becomes adherent to the cornea in the region of the section and, as healing goes on, with organization of cellular elements and contraction, the iris or the pillars of the coloboma are stretched, with the result that eccentric pupils of varying shapes are seen.

I have seen many drawn-up pupils with neither vitreous prolapse nor incarceration of iris to explain their presence. That this contraction of adhesions—thread like, pin-point or linear—of the iris to the back of the cornea may be a cause of the malformed, eccentric pupil is possible, apart from actual incarceration of the iris in the wound. Many cases cannot be explained. Perhaps better illumination and greater care might have demonstrated other causes for this annoying and uncertain complication, which though it may not in any way interfere with vision, gives a very bad cosmetic result.

As one can imagine the complete iridectomy gives the true boat-shaped pupil, while the transversely oval pupil and the eccentric circular pupil are seen in those cases where a marginal or peripheral iridectomy or no iridectomy is done. The following table shows the percentage of cases in which adhesions were noted, and, as one would expect, the peripheral iridectomy gives the best results, preventing as it does, ballooning of the iris against the corneal wound as the anterior chamber re-forms.

	Cases.	Adhesions noted in.	Per cent.
Complete iridectomy	650	33	5.07
Marginal iridectomy	144	6	4.30
Peripheral iridectomy	216	6	2.70
No iridectomy	240	10	4.10

Choroidal Haemorrhage

In Sind the incidence of glaucoma is high and the chances of meeting choroidal haemorrhage as a complication are very great. These patients clamour for operation, knowing that in operation lies their only hope of some vision, however little it may prove to be. They practise all sorts of deceptions in order to pass the examining surgeon, and even when finally refused operation, they

are found later sitting quietly amongst those who are being prepared for operation. One striking fact which the work at Shikarpur has demonstrated is the effect that the routine use of the tonometer has in decreasing the number of cases of choroidal haemorrhage. Tonometry, however, useful as it is, can only serve as a guide in helping one to decide what operative measures can be undertaken with safety in dealing with eyes in which tension is raised. Other factors must be considered; how long the tension has lasted, the presence of arterio-sclerosis, the blood pressure, the presence of intercurrent disease; and the perplexing feature is that in spite of all precautions, choroidal haemorrhage will be met with. If the choroidal vessels are healthy, then the degree of intraocular tension will be a matter of less moment, but a slight increase of tension, in a patient the subject of general arterio-sclerosis, will call for care and judgment. Those who have seen many cases of choroidal haemorrhage, both expulsive and concealed, will agree with W. R. Parker[10] when he states that, while the three cases of expulsive haemorrhage reported in his series of 1,421 cases, occurred in patients with advanced arterio-sclerosis, yet "there was no indication that a haemorrhage was more likely to occur than in any one of a large number of patients with equally severe symptoms on whom a similar operation was successfully performed." If hypertension is present and the occurrence of haemorrhage seems possible then a capsulotomy might be performed, or Hari Shankar's method of applying gentle pressure to the globe for a minute or longer might be resorted to. In one instance, in which the tension was 50 mm. Hg and the patient complained of pain on completion of the corneal incision, I left the lens in position, bandaged the eye, gave the patient a quarter of a grain of morphia and sent him back to bed. Seven days later I removed the lens in the capsule by Barraquer's method, with no untoward results. No iridectomy was done, a central black pupil remained and the visual result was very good. One might infer here that pain pointed to dilating intraocular vessels, which were prevented from rupturing by leaving the lens in position and bandaging the eye and thus maintaining what intraocular pressure remained. In some doubtful cases I have made the incision, put a moist pad on the eye and waited fifteen minutes before going on with the operation, and have not so far seen a haemorrhage in cases so treated.

E. E. Maddox[11] reports a case in which he successfully extracted a cataract in the capsule, the patient having lost the other eye as a result of choroidal haemorrhage. A preliminary iridectomy was done one week before the extraction. Calcium lactate was given the night before, and morphia and bromide on the morning of the operation. Before commencing the operation venesection was

done and the episcleral veins pricked. A corneal suture was employed and a pressure bandage applied. After operation hot turpentine stupes were applied to the abdomen, and the feet kept warm to promote circulation of the blood in the abdomen and the lower extremities.

Osmotic therapy, as suggested by Duke-Elder,[12] would appear to be of definite value as a preliminary to operation, in cases of hypertension. The difficulty, however, remains with those cases in which increase of tension is not a feature.

I make no mention of post-operative glaucoma as a complication, because so few cases of this are seen, due doubtless in part to the fact that difficulty is experienced in following up cases after operation, in India.

I am indebted to Dr. Holland for the help he has given me and for the opportunity afforded me of reviewing the work done, under his direction, at Shikarpur.

REFERENCES

1. Holland, H. T.—*Indian Med. Gaz.*, Vol. LVII, p. 296, 1922.
2. Cruickshank, M. M.—*Brit. Jl. of Ophthal.*, Vol. IX, 1925.
3. Smith, H.—*Arch. of Ophthal.*, Vol. LV., 1926.
4. Wright, R. E.—Reports of the Madras Eye Hospital, 1923,
5. Lister, A. E. J., cited Smith. H.—Treatment of Cataract, 1910.
6. Hari Shankar.—*Indian Med. Gaz.*, Vol. LVIII, p. 251, 1923.
7. Maynard, F. P.—Manual of Ophthalmic Operations, p. 114, 1920.
8. Alexander, G. F.—*Trans. Ophthal. Soc. U.K.*, Vol. LXXVIII, p. 16, 1924.
9. Kirkpatrick, H.—Cataract and its Treatment, 1921.
10. Parker, W. R.—*Trans. Section on Ophthal., Amer. Med. Assoc.*, 1921.
11. Maddox, E. E.—*Amer Jl. of Ophthal.*, p. 726, 1920.
12. Duke-Elder, W. S.—*Brit. Jl. of Ophthal.*, Vol. X, p. 30, 1926.

ANNOTATIONS

The Effect of Eyestrain on the Output of Linkers in the Hosiery Industry

In the April number of this year we commented on a report of the Medical Research Council on the effect of illumination in fine work (type-setting by hand). Another report of the Industrial Fatigue Board approaches the subject from another side, *i.e.*, the possible advantages of reducing the necessary accommodative work with the aid of glasses. The experimental work was done by Messrs. H. C. Weston and S. Adams, while Mr. Laws was responsible for the estimation and correction of refraction in the

subjects on whom the observations were made. The work of linking up machine-made hosiery is very fine, the operators requiring to be from five to eight inches from the machine, and, since nearly 80 per cent. of the factory work consists of linking, it is obvious that a very prolonged accommodative effort is required. The lighting conditions were tested first and found to be adequate. The output of three operatives (two experienced and one learner) was recorded for a period of four weeks in order to determine the normal rate of work under existing conditions. The operatives were then examined and fitted with suitable glasses, and their output recorded during a second period of four weeks. Charts and photographs accompany this part of the report. As a result it was found that for each subject a considerable increase in the rate of working accompanied by a reduction of fatigue was effected as a result of the use of glasses. Further, after the conclusion of the experiments the subjects continued to wear the glasses. Mr. Laws states in the appendix that the subjects were allowed to choose the sphere, which added to their estimated refraction gave them the sharpest vision at the desired distance. This varied from 0.75D. to 1.75D. No effort was made to aid convergence with a prism, though the authors suggest that this might be of even further use.

These reports of the Medical Research Council are of very great value and we trust that they will find a wider circulation than most Government publications.

Judicial Blinding

Perhaps the above title is not the best that could be chosen, since few of those who suffered mutilation by having their eyes put out in early times, probably, had any chance of a judicial hearing as we should conceive it nowadays, before the sentence was carried into execution. We do not pretend to know much about the history of the laws of the realm, but we doubt whether blinding was much used as a penalty after the days of Glanvill (1180). There can, however, be no doubt that it was frequently performed before that date. Common sense must have convinced people that a blinded man might just as well be dead and not be a tax on the community or any member of it.

Among the statutes of the Conqueror, given by Stubbs in "Select Charters" is the following: "Interdicto etiam ne quis occidatur aut suspendatur pro aliqua culpa, sed eruantur oculi, et testiculi abscidantur. Et hoc praeceptum non est violatum super forisfacturam meam plenam."

The details of an early example of blinding are narrated by Freeman in the "History of the Norman Conquest," Vol. I, pp. 545-550, and may be of interest to our readers:

"On the death of Cnut in 1036 the Aethelings Eadward, afterwards the Confessor, and his younger brother, Aelfred, the sons of Aethelred the Unready, *i.e.*, lacking rede or counsel, and Emma his wife, made an attempt to recover the English kingdom. The chronicles of the time are exceedingly indefinite, and it does not seem clear how great a part Eadward took in the enterprise; he is said to have landed at Southampton, to have won a skirmish, and to have decamped with his plunder. His brother's attempt is better recorded. Soon after Eadward's return, Aelfred landed at Dover, was received by Godwine 'freondlice,' friendly, and it is recorded that he supped at Guildford. During the night he was taken prisoner and sent to Cnut's son, Harold, the King of England. Harold is said to have blinded the Aetheling and to have sent him to Ely, naked, with his legs tied under his horse's belly. At Ely he died, as the weapon with which his eyes had been cut out had wounded the brain. 'cui dum oculi effoderentur cultro cerebrum violavit mucro.'"

In this very early example of excision we may assume either that the executioner must have been extremely clumsy or more probably that the wounds were infected and that the unfortunate Aetheling died from the results of an extension of infection backwards to the meninges and brain.

A later example of what we have called judicial blinding took place at the siege of Exeter by the Conqueror in 1067. The same story is told of the siege of Oxford.

Before ordering an assault on the defences of the city William had the eyes of one of those who had been sent to him as hostages put out in the presence of the two forces. This would seem to be stretching the rules of warfare to an unwarrantable limit, but the Conqueror had his reasons. William of Malmesbury, *Gesta Regum Anglorum, lib.* 3, section 248, gives these as follows: "quia unus eorum, supra murum stans, nudato inguine auras sonitu inferioris partis turbaverat, pro contemptu videlicet Normannorum."

Of a truth William lived up to his reputation recorded by Robert of Gloucester:

"To hem that wolde his wylle do, debonere he was and mylde,
And to hem that hym wythseyde stark tyrant and wylde."

We cannot help feeling that he was unnecessarily stark in this instance; he should have sworn by the splendour of God to have so treated the contemptuous culprit, when he had caught him, and not one sent as a hostage. Under his son, Henry the First, the art of judicial blinding seems to have reached its acme.

COUNCIL OF BRITISH OPHTHALMOLOGISTS

Annual Report

THE Council presents its report for the session 1926-1927.

At the first meeting of the session the following officers were elected:— President: Mr. J. Herbert Fisher; Vice-Presidents: Sir George Berry, M.P. and Sir John Parsons; Hon. Treasurer: Mr. M. S. Mayou; Hon. Secretary: Mr. W. H. McMullen.

The following members were appointed to serve on the Executive Committee: Mr. E. Treacher Collins, Sir John Parsons, Mr. M. S. Mayou, Mr. F. A. Juler, with the President and Secretary *ex-officiis*.

The arrangements made by approved societies for provision of ophthalmic benefit have continued to engage the attention of the Council. It regrets to note that only a few of these societies have adopted the full scheme for the provision of ophthalmic benefit approved by the Ministry of Health. The majority of the societies provide an examination by an ophthalmic surgeon only after the member has been examined by an optician. The policy adopted by hospitals with regard to the treatment of insured persons is of great importance in relation to this question. In order to obtain information on this subject a sub-committee was appointed to make inquiries. A report based upon the information so obtained has been passed by the Council and will be published at an early date. This subject has also been under the consideration of the British Medical Association, and the Council has endeavoured to make arrangements for effective joint action with that body, but so far without success.

The Council having learnt that a Bill for the Registration of Sight-Testing Opticians, promoted by the Joint Council of Qualified Opticians, is to be introduced in Parliament at an early date, sent to each of the members of Parliament officially supporting the Bill a copy of the Council's report on Sight-Testing by Opticians. The Council also communicated with the General Medical Council and was informed that that body had the matter already under its consideration. The Minister of Health has appointed a Departmental Committee to examine the Bill, and Mr. E. Treacher Collins, late President of this Council is a member of the Committee.

The Council desires to thank the National Committee for the Prevention of Blindness (U.S.A.) for copies of its publications.

Committees are engaged on the following subjects:

(1) An inquiry as to how far the recommendations of the Departmental Committee on the Causes and Prevention of Blind-

ness with reference to ophthalmia neonatorum have been put into practice.

(2) An inquiry as to what effect has been given to the recommendations of the Departmental Committee on the Causes and Prevention of Blindness in respect of industrial eye diseases and accidents.

(3) On the Standardization of Test Types.

The last-named Committee is awaiting the publication of the results of investigations with regard to types at present being carried out under the direction of the Medical Research Council.

The expenses of the Council have been defrayed as in former years by its members.

The Council desires to thank the Council of the Royal Society of Medicine for the use of rooms for meetings.

Interim Report on the Treatment of Insured Persons at Hospitals since the adoption of the Scheme for Provision of Ophthalmic Benefit

A FEW approved societies have adopted the full scheme for provision of ophthalmic benefit agreed upon by the Ministry of Health and the Joint Committee of the Council of British Ophthalmologists, the British Medical Association and the Ophthalmic Benefit Committee. Under this scheme a member should obtain a certificate from his panel practitioner, stating that he requires examination by an ophthalmic surgeon; this certificate is to be presented to his society, from which a letter can be obtained entitling him to see an ophthalmic surgeon for a fee of one guinea, which will be paid by the society.

Most of the societies will not issue this letter unless the patient has been seen by an optician, who will examine his eyes and either supply glasses, or report that an examination by an ophthalmic surgeon is necessary.

It necessarily follows that if members of approved societies providing ophthalmic benefit are referred back from hospitals to their panel practitioners they will probably receive treatment by an optician only.

As far as the information at the disposal of the Council goes it is able to report as follow:

(*a*) At all hospitals all urgent cases are dealt with.

(*b*) At all hospitals patients who present themselves with letters from approved societies entitling them to full ophthalmic benefit are referred to an ophthalmic surgeon.

(*c*) At the Royal Eye Hospital all insured patients are given an explanatory leaflet and none but urgent cases are treated.

(*d*) At the Royal London Ophthalmic Hospital the almoner has a list of 249 societies which profess to give ophthalmic benefit, and members of these societies are not treated unless they are urgent cases. The surgeons decide as to whether cases are urgent or not.

(*e*) At the Royal Westminster and Central London Ophthalmic Hospitals insured patients are treated as ordinary cases except as under (*b*).

(*f*) Similarly diverse methods of procedure obtain in the Provincial Hospitals, some referring back members of approved societies, others treating them in the ordinary way.

Recommendations

(1) That every hospital keep a list as complete as possible of societies providing full ophthalmic benefit (*vide* first paragraph of this report) in order that the registration clerk or other officer may readily ascertain whether insured patients are entitled to such benefit.

(2) That patients entitled to full ophthalmic benefit be given a printed slip explaining how it may be obtained through their societies and be referred to their panel doctors.

(3) That notices be displayed in out-patient waiting halls calling attention to the provision of ophthalmic benefit by some societies, and advising insured patients to apply to the registration clerk or other officer of the hospital for information.

THE ANNUAL CONGRESS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM, 1927

THE Ophthalmological Society of the United Kingdom held its Annual Congress this year, at Liverpool, on April 28, 29, and 30, under the presidency of Sir John H. Parsons. The proceedings were opened by the Lord Mayor of the city, Councillor F. C. Bowring, who also entertained the delegates to luncheon. In addition to a full scientific programme, and a well-organized clinical meeting, the social aspects of the Congress were well catered for, and an ophthalmological museum was provided by the good offices of Mr. Chavasse. The Edward Nettleship Medal for 1927 was presented to Mr. C. H. Usher of Aberdeen, the president-elect for the coming year, for his extensive investigations into the hereditary transmission of ocular diseases.

A full account of the papers and discussions will be published in the *Transactions* of the Society: merely an indication of the subjects of debate is given here.

Mr. E. Treacher Collins read a paper on metaplasia of the tissues of the eyeball. He defined metaplasia as the production of specialized tissues from cells which normally produced tissue of other orders, owing to an alteration in environment, and not necessarily, or even primarily, in function; and he divided the metaplasias met with in the ocular tissues into embryological, pathological, neoplastic, and biological. Mr. R. A. Greeves described an operation for partial contraction of the socket, the essential feature of which consisted in the removal of fat and fibrous tissue. Dr. George Young discussed practical keratometry; and Dr. P. Stibbe demonstrated specimens illustrating the comparative anatomy of the nictitating membrane. Dr. Gordon Holmes dealt with tumours involving the chiasma, excluding those of the pituitary. Dr. A. W. M. Houwer presented a paper on keratitis filamentosa; Col. H. Herbert one on glass membrane formation in irido-cyclitis; and Mr. G. F. Alexander discussed the causation of striate keratitis, and suggested a new method of controlling the eye in the operation for cataract. Mr. M. S. Mayou discussed the distension of the neural canal in the embryo in relation to microphthalmos. Mr. F. Juler described a case of sarcoma of the eyelid which was apparently cured by radium; and Mr. T. C. Summers dealt with a case of papilloedema occurring in a pedigree bull. Miss I. C. Mann communicated original embryological, histological, and clinical observations on the nature and boundaries of the vitreous. Embryologically it was shown to consist of three parts, a primary, derived from the optic vesicle and lens plate; a secondary, from the retina; and a tertiary, derived from the ciliary epithelium. She concluded that the vitreous is a gel enclosed within the meshes of a fibrous scaffold, and is not anywhere limited by a structureless membrane; that the fibrils are continuous with the Müllerian fibre system in the retina; that it is most strongly adherent at the ora serrata and along Egger's line on the capsule of the lens; and that the canal of Cloquet can under certain conditions be demonstrated by *intra-vitam* (slit-lamp) examination.

In addition to the papers there were two set debates, the first on nystagmus (other than miners'), the second, which produced many speakers, on the aetiology and treatment of hypopyon ulcer.

In opening the first, Mr. Chavasse indicated the many points of view from which nystagmus could be regarded: as a simple movement, as a disease, as a symptom, as an adaptation to a habit, or as a problem in neurology. He insisted that the essential aspect of the problem was neurological, on which basis he discussed it at some length, dwelling especially on the differential diagnosis. If nystagmus in a case was jerking with a widespread field and it was uninfluenced by occlusion, it probably indicated a wide-

spread affection. If the movements in the two eyes were dissociated, probably there was a comparatively peripheral lesion while an associated nystagmus would lead one to suspect a lesion in higher or more remote centres, influencing intact neuro-muscular end-organs. Dr. Hugh Jones exhibited a model of the semicircular canals to show their relationship with other associated structures in various head postures, and followed this by demonstrating the absence of nystagmus after rapid rotation in a revolving chair in a patient who had lost the function of both labyrinths following acute influenza. Dr. Gordon Holmes pointed out that there must be taken into account vestibular components which compensated movements of the head and body, visual components which compensated movements of the eyes, and voluntary components which adjusted the eyes, as well as the stimuli of sight in the field of vision. Of these the vestibular components were the most important. Nystagmus depended essentially on lesions of those paths and centres which were limited to the hind-brain and intimately connected with the vestibular apparatus, and, in his opinion, never arose from a lesion of the fore-brain. It might occur in asthenic states and intoxications, and might also be the result of a defective fixation reflex; but in all cases it was a definite co-ordinated act, which could occur even when the muscles were partially paralyzed, and it should never be regarded merely as a "tremor of the eyes." Mr. Sidney Scott discussed the subject from the point of view of the otologist, dealing with nystagmus as a manifestation of labyrinthine disease occurring in persons with normal vision. Several others joined in the discussion.

The debate on the aetiology and treatment of hypopyon ulcer was opened by Mr. Grey Clegg with an exhaustive statistical account of the factors concerned in its incidence, and a résumé of the therapeutic measures which have been advocated from time to time: local medicaments, heat, caustics, radiation, and operative interference. The bacteriological side of the question was dealt with by Dr. S. H. Browning, who insisted on the frequency of the pneumococcus in association with the condition, although the most virulent organism was the B. pyocyaneus. Oral infection also was an important factor. Treatment by purely bacteriological methods was on the whole unsatisfactory. Mr. M. S. Mayou also discussed the bacteriology involved, paying particular attention to the activities of the gonococcus. Mr. McMullen emphasized the importance of oral sepsis. Mr. Hudson discussed the operative treatment and advised the early resort to a Saemisch section when the tension rose, and suggested a method of dealing with complicating iris-inclusions. New methods of technique in this operation were described by Col. H. Herbert and Mr. C. Reid,

both of whom advocated a T-shaped incision, the former through the ulcer, the latter peripherally and extending up to the ulcer. Many other speakers entered into the discussion, prominent among whom was Dr. Freeland Fergus, who insisted on the importance of prophylactic measures, and gave a refreshing account of the treatment which he had relied upon with success for many years, which consisted in essence of the absence of bandaging and ointments, and the employment of continuous bathings and miotics. On the whole with its multitude of remedies and many conflicting opinions, the debate made clear the unsatisfactory state of our present means of dealing with this common and mutilating condition.

W. S. DUKE-ELDER.

ABSTRACTS

I.—DISEASE OF UVEA

(1) **de Schweinitz, G. E. (Philadelphia).—The clinical features and aetiologic factors of progressive atrophy of the iris and the formation of holes in its tissue.** *Trans. Amer. Ophthal. Soc.*, Vol. XXIV, 1926.

(1) de Schweinitz gives in this paper the subsequent history of a case of this rare affection, a case which was first recorded by him in 1915, and discusses the various theories that may be held to account for it. The patient was a woman, aged 23 years, with no noteworthy points in her family history. In addition to measles, scarlet fever, whooping cough, pneumonia and pleurisy she had suffered from adenitis of the neck and suppuration of the axillary glands. Her eyes were examined during her school life and found to be normal. The first alteration, in the shape of an egg-shaped pupil with evidence of thinning and degeneration of the iris of the left eye, was noticed in 1912. The condition rapidly progressed, and the first rise of intraocular pressure was noted in 1914. Operation was refused and by the end of 1920 the glaucoma was absolute. In 1921 the patient had a severe attack of retrobulbar neuritis in the right eye which had previously been normal. Although this cleared up completely with normal vision, symptoms pointing to disseminated sclerosis made their appearance. The changes in the iris are illustrated by a black and white plate showing three different stages, and an excellent coloured plate

showing the present state. The author points out that these cases must not be confused with congenital abnormalities; they are not congenital and are always progressive. He does not consider that in the present state of our knowledge we are justified in giving them a more definite title than that of "essential"; such terms as primary and spontaneous should not be used. He rather favours the idea of including them under the "ocular abiotrophies" provided it is permissible to do so in face of the fact that there is no evidence that they are ever familial. In the ensuing discussion several additional cases were instanced by the members present.

E.E.H.

(2) **Verhoeff, Dr. F. H. (Boston).—An effective treatment for sympathetic uveitis.** *Trans. Amer. Ophthal. Soc.*, Vol. XXIV, 1926.

(2) **Verhoeff** was induced to make a trial of frequent subcutaneous injections of diphtheria antitoxin in large doses from the following considerations: "first, that horses were not subject to sympathetic uveitis, and hence their serum might be antagonistic to the disease; second, that the serum of a horse immunized to diphtheria toxin probably contained enhanced non-specific factors of immunity; third, that it was remotely possible that the antitoxin itself might be antagonistic to the disease; fourth, that the serum might act as an anti-anaphylactic in case the anaphylactic theory of the disease was true." Seven cases in all were treated. In four of these the diagnosis was confirmed by microscopic examination of the exciting eye, and in one by examination of iris tissue removed from the sympathizing eye; while in the remaining two diagnosis rested on the history and clinical course of the disease. In all seven there could be no reasonable doubt as to the accuracy of the diagnosis. In four of the cases practically normal vision was recovered. One did not come under treatment until nine weeks had elapsed, and, though the treatment was successful in relieving ocular congestion and pain, no useful vision was regained. In three of the cases operations for the relief of tension were performed safely at an early period, and in one the lens was removed after the eye had been quiet for six months.

While admitting that seven cases are rather a small number for the foundation of a new treatment, Verhoeff considers that the results of these were so good as to warrant him in formulating the following scheme of treatment: "the exciting eye is removed only if it is so badly injured that there is no reasonable chance that it will recover useful vision. The patient is tested for hypersensitiveness to antitoxin by injecting one drop intradermally. If there is no reaction within thirty minutes, the test is negative. If

negative, 20,000 units of diphtheria antitoxin are heated to body temperature and injected subcutaneously or intramuscularly, preferably into the buttocks. If the test is positive the patient is desensitized by injecting the antitoxin at intervals of fifteen minutes in divided doses—0.1c.c., 0.2c.c., 0.5c.c., 1c.c., 1.5c.c., 2c.c., 2.5c.c. —and then the remainder of the 20,000 units. In the case of children the dose is reduced in proportion to body weight. The same dose is given daily for one week. If the case is an early one, and the ocular congestion has subsided within this time, the injections are discontinued for one week and then given at weekly intervals for two or three weeks. If the case is an advanced one the daily injections are continued until marked improvement has taken place or the patient has developed severe symptoms of anaphylaxis. They are then given at weekly intervals, each time in divided doses. In cases with marked congestion sodium salicylate is given in increasing doses, but not to the limit of toleration. Locally, atropine is employed in the usual manner. If the pupil does not dilate fully, or if there is an increase of tension, daily subconjunctival injections of adrenaline are given. If the tension remains over 28 mm. (Souter), iridectomy is done as soon as the eye otherwise shows marked improvement. If there is a pupillary membrane which reduces vision too greatly, and the eye has remained quiet for three months or longer, the lens is removed, the patient being kept under the influence of antitoxin by daily injections before and after operation."

E.E.H.

II.—THE OCULAR MUSCLES

(1) **Wootton, Dr. Herbert Wright. The non-surgical treatment of heterophoria in ametropia.** *Arch. of Ophthal.*, September, 1926.

(1) **Wootton** agrees with Duane in regarding the phorias as defects of convergence or divergence rather than of individual muscles. Thus esophoria represents convergence excess or divergence insufficiency, exophoria the opposite condition. Convergence excess is due to hypermetropia and ceases to give trouble after the hypermetropia has been properly corrected. Convergence insufficiency may be due solely to uncorrected myopia and may disappear on its correction. In other cases, however, it accompanies hypermetropia. Prism exercises may help but their effect is usually temporary. The prescription of prisms base in for near work usually suffices to make the patient comfortable, though

theoretically they should eventually make the error worse. Divergence excess does not cause symptoms unless it passes into divergent squint when operation is required. Divergence insufficiency is not benefited by prism exercises. The result of the constant wearing of prisms base out is frequently satisfactory and should always be tried before resorting to operation. Hyperphoria can generally be corrected with prisms. In the writer's opinion the bad effects of hyperphoria of low degree have been greatly exaggerated and cases requiring operation are extremely rare.

F. A. WILLIAMSON-NOBLE.

(2) **Berens, Dr. C., Hardy, Dr. Le Grand, and Pierce, H. F. (New York).—Studies in ocular fatigue. II. Convergence fatigue in practice.** *Trans. Amer. Ophthal. Soc.*, Vol. XXIV, 1926.

(2) **Berens, Hardy,** and **Pierce** have been conducting a series of tests on convergence fatigue with a modification of the ergograph previously described by them. The ergograph consists of a test-object mounted on a light carriage arranged to move along a horizontal track toward or away from the patient's eyes, and a motor-driven kymograph upon which the movements of the test-object are automatically recorded. The test-object, a 2 mm. black dot on a white card, is mounted at the end of a rod which passes through a sleeve affixed to the carriage. The carriage bearing the test-object, is automatically advanced towards the patient's eyes by a spring, the rate of movement being controlled by a fan-governor. The forward motion may be stopped, and the carriage returned to its base-line position, by the operation of a lever controlled by the patient. Graphs, together with the records of various tests are given, and the authors reach the following conclusions: "(1) The present form of the ophthalmic ergograph gives data which, if properly interpreted, should aid in the clinical diagnosis and treatment of errors of convergence. Before these data can be of great comparative value a new instrument which will automatically allow rest periods of the same duration will have to be constructed. Tests must also be made on trained subjects, ocularly and physically normal, with rigid control of all disturbing factors, in order that conclusions may be drawn in regard to normal convergence fatigue. (2) Signs of fatigue encountered in making ergographic records of convergence adduction seem to give us more valuable clinical data than ergographic records of prism convergence. (3) The use of the ophthalmic ergograph has not yet revealed ocular fatigue in any patient whose muscle balance and muscle strength met the requirements of the standard we previously set. (4) Tests of convergence fatigue as made by the present

method allow us to study the maximum convergence effort that will be tolerated for a short time. We believe that we can determine the presence of poor binocular adjustment, but we do not claim to be able to predict how long the eyes can sustain convergence with comfort under normal conditions or under conditions of stress. We believe that we can generally determine the individual capacity for resistance to fatigue of convergence adduction at a given time, and hope to be able to measure actual ability and perfection of adjustment of convergence so that the individual graphs will be totally comparable."

E.E.H.

III.—OPERATIONS

(1) **Verhoeff, Dr. F. H. (Boston).—Corneo-conjunctival suture for cataract operations.** *Trans. Amer. Ophthal. Soc.*, Vol. XXIV, 1926.

(1) **Verhoeff** has always been a strong advocate of the use of a suture in cataract operations. In the present paper he claims to have made considerable improvement on his previous methods. His account of the method is as follows: "A fine black silk thread armed with two small half-curved needles is provided. The eye is fixed by grasping the superior rectus tendon with forceps. At a distance of from 1.5 mm. to 2 mm. from the middle of the upper limbus a secure bite, about 1.25 mm. long, is taken horizontally in the cornea with one of the needles, and half of the thread drawn through. Immediately above this, by means of scissors, the conjunctiva is freed exactly at its corneal margin for a distance of about 7 mm., and then, if necessary, undermined slightly to permit it to be pulled down over the suture holes in the cornea. The two needles are now passed through the conjunctival flap from underneath, about 1.25 mm. apart and at a distance of about 2 mm. from its cut edge. The two threads are pulled taut, and then by means of a strabismus hook, drawn out again in the form of two loops. These are placed to one side so as to allow the passage of a cataract knife. The cataract incision is now made as close as possible to the limbus without anywhere cutting the conjunctiva. Iridectomy is performed if desired. The free ends of the suture are now placed on the cheek ready to be grasped. The cataract is expressed and the wound immediately closed by pulling the threads downwards and tying them. . . . The sutures may be removed in about five days." Two diagrams illustrate the procedure. Verhoeff considers that the placing of the corneal

insertion of the suture at a considerable distance from the cataract incision is a great advantage since it prevents lateral displacement of the corneal flap and overriding of the lips of the wound.

In the subsequent discussion Dr. Peter (Philadelphia) said that he personally had never considered it necessary to use a suture, and raised the point that any procedure that tended to prolong the operation added to the strain on the patient's control. To this Verhoeff replied that, on the contrary, he had found that during the dissection of the flap the patient got accustomed to being operated on and actually behaved better during the actual extraction of the cataract.

E.E.H.

(2) **Duverger, C. (Strasbourg).—Removal of pterygium: employment of a graft of buccal mucous membrane. (Extirpation du ptérygion et greffe de muqueuse buccale.)** *Arch. d'Ophtal.*, December, 1926.

(2) For the removal of pterygium by surgical means **Duverger** has employed all the accredited methods and has found the percentage of recurrence about the same for all. These recurrences are sometimes early, rapid, and more invasive than the primary growth; they are often thicker, more adherent, more rigid, and may cause diplopia by interference with abduction of the eye. Each recurrence is more troublesome to remove, the available conjunctiva being more restricted after each operation so that it becomes increasingly difficult to cover the site of the growth.

In some cases with one or more recurrences Duverger made use of grafts of epidermis; these were successfully applied and were not followed by return of the pterygium. But the grafts were unsightly, yellow and dry in appearance and showed a tendency to desquamation. He then had recourse to grafts of buccal mucous membrane with very satisfactory results. The technique adopted is described in detail aided by four illustrations. Briefly, the pterygium is completely removed by knife and scissors, leaving a rectangular denuded surface. This is accurately covered (except the corneal portion) by a graft of mucous membrane taken from the inner surface of the lower lip and carefully stitched into position, from the limbal edge inwards to the nasal border of the wound. The sutures are removed and the bandage discontinued on the third day.

Duverger has followed this method for six years and has operated on fifty cases with only one known recurrence. In that case the flap, imperfectly sutured, slipped partly out of place leaving a portion of the wound uncovered. Three months later a partial return of the growth was observed in the area from which

the graft had escaped. One drawback to this procedure noted by Duverger is the red colour of the graft by which it contrasts rather obviously with the white of the sclera.

J. B. LAWFORD.

(3) **Weekers, L. (Liège).—The betterment of ocular prosthesis by burying the eyeball in the orbit. (Amélioration de la prothèse oculaire par l'enfouissement du globe.)** *Arch. d'Ophtal.*, January, 1927.

(3) In a recent paper **Weekers** and **Lambrecht** (*Arch. d'Ophtal.*, June, 1926; *Brit. Jl. Ophthal.*, p. 305, 1927) recorded a case of autoplasty of the eyeball in a man whose eye was entirely severed from its attachments as the result of an accident.

The clinical observation of the case reported, and experiments now being carried on, showed the writer that there was no re-establishment of nervous and vascular connections between the graft and its bed. In the grafted eyeball, deprived of its vascularity, profound degeneration of the uveal tract and retina occurs. Those tissues which are normally avascular (cornea and lens) or have a limited blood supply (sclera) are resistant to degenerative changes. Hence if autoplasty of a painful eyeball be done the suppression of all nerve connections leads to complete suppression of pain.

The experience in the case referred to above led Weekers to experiment in utilizing an eyeball condemned to excision, as an aid to ocular prosthesis, by its inclusion deep in the orbit. He has adopted this procedure in five cases with satisfactory results in all. The operation has proved equally successful in rabbits.

Local anaesthesia is employed; the conjunctiva is dissected from the globe all round the limbus; the tendon of each rectus muscle is picked up on a strabismus hook, attached by a catgut stitch to the conjunctiva immediately over it, and divided close to the sclera, except in the case of the internal rectus of which a short portion is left attached to the globe. The eyeball is then completely and carefully separated from all its remaining anatomical connections by the use of curved scissors. By means of forceps holding the internal rectus tendon the globe is strongly rotated outwards and the optic nerve divided. The next step is designed to give the globe a new position rotating it outwards so that the cornea is no longer visible to the operator. It is necessary to bring to the front a vivified part of the surface of the eyeball which will form adhesions with the conjunctiva by which it will be covered. To this end a two-needled catgut suture is passed through the stump of the internal rectus tendon and deeply through the conjunctiva near the external canthus. When tightly tied the eyeball is rotated strongly outwards and the

cornea is completely hidden. The final step is to stitch the conjunctiva by interrupted sutures in a horizontal line.

In no one of the five cases has there been any troublesome haemorrhage or other complication; the conjunctiva has healed by first intention. The stump formed by this procedure is very mobile as a result of adhesions which form between the globe and the recti muscles and the cosmetic results are very satisfactory. The description of the operation is illustrated by diagrams.

This operation cannot be of universal application. It is of course unsuitable in all cases in which there is the smallest suspicion of an intraocular new growth or the possibility of sympathetic ophthalmitis.

J. B. LAWFORD.

(4) **Braunstein, E. P. (Charkow).—On the operation for ptosis. (Zur Operation der Ptosis.)** *Arch. f. Ophthal.*, Vol. CXVI, 1926.

(4) The essential features of the operation for ptosis which **Braunstein** here describes, consist in approaching the levator palpebrae from the conjunctival side of the lid and in excising a portion of the muscle, whereby he obviates any disfigurement of the anterior surface of the upper lid.

The procedure is as follows: The lid is totally everted and a large flap of conjunctiva is separated from the underlying fascia and muscles, turned down, and two fine silk sutures are applied close to its lower margin. Then by means of two parallel vertical incisions a band of the combined levator palpebrae and Müller's muscle is marked out and separated by the aid of a strabismus hook which is passed under it. From the centre of this band a strip measuring 6 mm. to 8 mm. vertically, according to the degree of the ptosis, is excised, and the ends are brought together by means of catgut sutures. The conjunctival flap is then brought into place by means of the silk sutures.

The method of applying the sutures to unite the cut ends of the muscle and the successful results from the operation are shown by illustrations.

THOS. SNOWBALL.

(5) **Ball, James Moores (St. Louis, U.S.A.)—Skin grafting in acute symblepharon.** *Lancet*, April 24, 1926.

(5) **Ball's** case was one of extensive lime burn with practical destruction of the cornea. An attempt was made to save the eye so that it might form a movable stump and drastic measures were adopted in the effort to cure the symblepharon. The methods adopted are not described in any detail and a direct quotation will indicate the method. The adhesions having been severed "a

huge graft (Thiersch) was sewed into the upper fornix. The lower fornix presented a more difficult problem. Here a silver plate (provided with several openings at each end) of the approximate length and depth of the inner surface of the lower lid, was used. A large graft was spread over and was sewed to the plate. The plate, thus covered, was then placed with its lower edge about 2 mm. below the lower boundary of the fornix, and was anchored to the eyelid." Eventually the eyeball had to be enucleated but a good space for a prosthesis was left.

ERNEST THOMSON.

IV.—NEUROLOGY

(1) **Rollet and Colrat (Lyon).—Zona ophthalmica and crossed hemiparesis. Double lesion: inflammation of the Gasserian ganglion and cerebral softening. (Zona ophtalmique et hémiparésie alterne. Double lésion: Inflammation du ganglion de Gasser et ramollissement cérébral.)** *Arch. d'Ophtal.*, October, 1926.

(1) The clinical report published by **Rollet** and **Colrat** is noteworthy, cases of this description being uncommon: its value is much enhanced by notes of a post-mortem examination.

The patient, a male, aged 79 years, had a severe attack of ophthalmic herpes of the left side, with all the usual symptoms: the eye was seriously affected with ulceration of the cornea and iritis: eight to nine days later paralysis of the oculo-motor nerve developed. No signs of cerebral disease were present.

Fifty-two days after the onset of the herpetic attack, crossed hemiparesis developed without any sensory disturbance. The conditions remained unchanged until the patient's death nine days later, from broncho-pneumonia.

The case, of which the authors furnish complete notes, is therefore one of *left* ophthalmic herpes, complicated very shortly by paralysis of the oculo-motor nerve of the same side and at a much later date by *crossed* hemiplegia. The pathological lesions in the Gasserian ganglion and the ophthalmic nerve described originally by Wyss and later by Head and Campbell, and Sunde, were identified. In a case reported by Thomas and Heuyer, to which the authors refer, in addition to changes in the ganglion, lesions were found in the trunk of the trigeminus and along the intra-pontine course of its descending branch while its ascending branch remained intact. The development of right hemiparesis associated with left-sided ophthalmic herpes seemed to suggest the possibility of a central origin of the zona. Brissaud, after the

observation of three examples of zona ophthalmica with oculo-motor paralysis and crossed hemiplegia, suggested that a single lesion situated in the pes pedunculi, about the level of the termination of the ascending root of the trigeminus and near the nucleus of origin of the third nerve might explain such a syndrome. But in none of Brissaud's cases was an autopsy performed. In one an interval of six years elapsed between the attack of herpes and the onset of crossed hemiplegia. Rollet's case does not support Brissaud's hypothesis. Anatomical examination disclosed the existence of two separate lesions. The Gasserian ganglion and the trunk of the trigeminus were the seat of interstitial infiltration; the mesencephalon was healthy; the roots of the trigeminus and the nuclei of origin of the third nerve were intact. In the left hemisphere a focus of softening was found involving the lenticular nucleus and the internal capsule, providing an adequate explanation of the right-sided hemiparesis.

The authors express the opinion that while the hypothesis of a single central lesion in such cases is seductive it has never been verified. The case here recorded shows a more complex causation, the zona arising from the lesions of the Gasserian ganglion, the oculo-motor paralysis from concomitant meningitis; the hemiplegia from cerebral softening, an accidental and purely coincident lesion.

J. B. LAWFORD.

(2) **Beach, Dr. S. J. (Portland, Me.).—Familial maculo-cerebral degeneration in half-brother and sister.** *Trans. Amer. Ophthal. Soc.*, Vol. XXIV, 1926.

(2) **Beach** gives an account of two cases of maculo-cerebral degeneration of the type described by Oatman. His cases had the following characteristics common to the group. (1) They were familial. (2) Both patients were normal at birth. (3) Both were attacked at the age of about fourteen years. (4) The macular changes were symmetrical in the two eyes and were progressive. They differed, however, from the typical cases in that they showed mental changes and convulsions at the time of onset, a feature usually only observed in the early type. Beach discusses the question of his cases being border-line instances between the two groups. To this interpretation there are two objections: first, the cerebral changes observed by him were not of a degenerative nature but rather of that of a failure in development. Secondly, that although these cases controvert the statement that convulsions never occur in the late or macular variety, there is the negative observation that cases of both types have never yet been observed in the same family.

Beach discusses the literature of this and the allied affections

which, our readers will remember formed the subject of a paper at the Convention of English-speaking Ophthalmological Societies last year by Gordon Holmes and Leslie Paton (*Trans. Ophthal. Soc., U.K.*, Vol. XLV, p. 447).

E.E.H.

(3) **Barkas, Mary R.—Tonic spasm of the eyes in conjugate deviation.** *Lancet*, August 14, 1926.

(3) In this short note **Mary Barkas**, who is Assistant Medical Officer to Maudsley Hospital, warns us that it is not safe to label as hysterical certain cases which have hitherto been apt to receive that designation. The cases referred to are those in which there is spasmodic deviation of the eyes upward, usually to one side, accompanied by subjective distress and acute depressions. The author suggests that disorders of the basal ganglia may be the cause and relates three cases. The first case was one of progressive lenticular (cerebral) degeneration. The patient was childish and emotional and complained that her "eyes got fixed." At first the attacks of upward and to the left conjugate deviation lasted only for a few moments, but later lasted as long as an hour. The eyes could be moved voluntarily but only with an effort. No nystagmus or diplopia nor any alteration of the fields. The second case is somewhat similar, but later developed spasmodic torticollis and Parkinson symptoms. In the third case there was also ankle clonus and there was a history of encephalitis lethargica. The author concludes: "Since the symptom is of a kind likely to be disregarded or considered hysterical it seems worth while to draw attention to it as being, in some cases at least, an early manifestation of a serious and progressive organic disease. Its constant association with spasmodic attacks of depression or weeping affords further evidence of the close relation between the basal ganglia and the emotions, and tempts one to speculate as to a possible organic basis through which the emotions may produce physical manifestations in hysteria."

ERNEST THOMSON.

(4) ***Pascheff, C. (Sofia).*—The coincidence of the tic or syndrome of periodic upward deviation of the eyes with visual pseudo-hallucinations in epidemic lethargic encephalitis.** (**La coincidence du tic ou syndrome de la déviation périodique des yeux en haut avec des pseudo-hallucinations visuelles dans l'encéphalite léthargique épidémique.**) *Rev. gen. d'Ophtal.*, August, 1926.

(4) In *Archives d'Ophtalmologie*, No. 12, p. 740, 1925, **Pascheff** described a *peculiar tic* or *syndrome characterized by*

periodic upward deviation of the eyes which occurs as a late phenomenon in lethargic encephalitis. This phenomenon is not merely a spasm of the superior rectus but a syndrome independent of the will and of the reflex motor centres. The following is the author's description of the syndrome which is characterized by "the associated periodic deviation of the eyes in an upward direction while, at the same time, the eyelids open, the eyebrows are raised, the forehead is puckered, the gaze, the face, and the whole attention of the patient are directed towards a point in space as if he were attentively watching some object, which latter has no existence in reality." During these crises the patient is perfectly conscious. In one of the author's recent cases this syndrome had occurred four years after the commencement of the disease.

Quite recently in one case, a female, aged 26 years, "visual pseudo-hallucinations" occurred. Pascheff gives a full description of the history and of the physical condition of this patient who suffered from the deviation syndrome but who, in addition, had visual hallucinations while fully conscious, and who knew that the visions which occurred were unreal. These hallucinations appeared about twenty-seven times per day and changed spontaneously. Apparently they changed in accordance with the direction of gaze. Thus when looking forward the patient saw "many women, a train, many men, *puis une femme qui monte sur sa tête* (the exact meaning is uncertain to the reviewer), then women talking and men and women holding hands." Looking up for a moment the patient saw a she-bear, and, in other directions, a funeral procession including the corpse, a five story house, two women quarrelling and fighting and so on. Then the fully conscious patient would say "the visions are over." The author explains that he has called these hallucinations "pseudo" because all the time the patient knows that the objects are unreal. A very curious fact in this case is that these hallucinations occurred with various directions of regard but ceased when the upward deviation syndrome appeared. Pascheff's concluding paragraph may be given here: "The most interesting fact, and one which we have not found mentioned in literature, is the coincidence in the same patient of visual pseudo-hallucinations with the tic or syndrome of upward deviation of the eyes as late occurrences in epidemic lethargic encephalitis. This coincidence throws a new light on the localization of the tic or syndrome described which, as well as the visual hallucinations, is probably of cortical or, better still, subcortical origin."

ERNEST THOMSON.

(5) **Harms, Helene (Hamburg.)—On the occurrence of choked disc in cases of pituitary tumour. (Über das Vorkommen von Stauungspapille bei Hypophysentumoren.** *Arch. f. Augenheilk.*, December, 1925.

(5) **Harms,** an Assistant in Kümmell's Clinic, was led to go into this question by a case of papilloedema with changes in the sella Turcica that came under her observation. Struck by the wide differences of opinion among ophthalmologists, she made a critical analysis of 652 cases diagnosed as hypophyseal tumour —all the cases she could find in the literature up to the present. Her findings were as follow :

Skiagraphically ascertained alterations in the sella Turcica are not wholly confined to pituitary tumours and can result from increased cerebral pressure from whatever cause as, *e.g.*, cerebral tumours favourably situated, acquired hydrocephalus internus, dilatation of the third or lateral ventricle, aneurysm of the internal carotid and others.

Faulty diagnoses of hypophyseal tumours have occurred mostly in cases ushered in by papilloedema.

The presence of papilloedema points either to some factor, in addition to the pituitary tumours, confined to the sella, or to a wrong diagnosis of pituitary tumour.

In uncomplicated hypophyseal tumour choked disc is extremely rare.

In most cases of pituitary tumour ushered in by papilloedema or neuritis, operation results in rapid death, and hence papilloedema in pituitary tumour is a contraindication to operation.

D. V. GIRI.

(6) **Bourguet and de St. Martin.—Bitemporal hemianopia with great diminution of visual acuity due to cyst of the hypophysis. Operation, followed by return of visual acuity almost to normal. (Hémianopsie bitemporal avec forte diminution de l'acuité visuelle par kyste hypophysaire. Operation et retour de l'acuité presque à la normale.)** *La Clin. Ophtal.*, April, 1926.

(6) The case of hypophyseal cyst reported by **Bourguet** and **de St. Martin** is of much interest in that the cyst was attacked by the intra-nasal route. But it is right to state at the outset that the title leaves something to be desired in that it does not state that the hemianopia remained uncured. The patient was a woman, aged 34 years, who first noticed in 1917 that she was growing appreciably stouter. In 1919 there came on fronto-temporal headache. She was examined by St. Martin in 1925. No motor or sensory symptoms: no diplopia, pupils react to light and accommodation : fundi normal. Visual fields revealed a temporal

hemianopia with reduction of the nasal part. The visual acuity was R.E. 9/10; L.E. 2/10. The patient was sent to Duraud for radiography: the sella Turcica "was markedly increased antero-posteriorly; the clinoid processes were soft-looking (*floues*), especially the posterior." The patient was treated by radio-therapy for some three months without effect on the fields but with some improvement in left visual acuity and on September 17 she was operated on by Bourguet. The details of the operative procedure may be read in the original. The visual acuity gradually improved from the second day, and on October 7 was 8/10 and 6/10 in right and left eye respectively, as against 1/40 and 5/10 at the time of operation. On December 14, 1925, the visual acuity was 9/10 and 7/10 without alteration of the hemianopic condition. Examination of the friable material aspirated from the cavity seemed to show that the condition had been a hyper-plastic cystoma or adeno-cystoma.

NOTE.—Nothing is said by the authors as to the patient's condition between the years 1919 and 1925 when she was first examined by St. Martin.

ERNEST THOMSON.

V.—MISCELLANEOUS

(1) **Weekers, L., and Lambrecht, J. (Liège).—Auto-plasty of the eyeball. (Autogreffe du globe oculaire.)** *Arch. d'Ophtal.*, June, 1926.

(1) In connection with the notes of a case in a man, **Weekers** and **Lambrecht** publish a brief critical survey of the subject. Except for some abbreviation of the clinical notes the following is a full translation of their paper:

"Transplantation of the eyeball has been much discussed recently. An entire fasciculus of the *Archiv für mikroskopischen und Entwickelungsmechanik* (1923, Bd. 99, H.1.) has been devoted to the work of Przibram and of his pupils, Koppanyi, Kolmer, Jellinek, Wiesner. These authors have carried out a series of researches on fishes and amphibians, and also on vertebrates, chiefly the rat. Their experiments consisted in the complete removal of the eye from the orbit and its immediate replacement; in some instances a genuine transplantation was effected, the grafted eye being obtained from another animal of the same or a different species. Failures were numerous, nevertheless complete success was sometimes attained. In such cases the grafted eye, not only did not become atrophic, but even continued to develop as in a normal animal. Vascularization was re-established; the ocular media retained their transparency; the cornea recovered its sensitiveness;

the pupillary reaction to light re-appeared; the retinal functions were restored; the animals comported themselves as seeing animals.

It is difficult to avoid some scepticism in the perusal of these records. Criticism has not been wanting more especially from Marburg, Pillat, Guist, and others (*Soc. d'Ophtal. de Vienne*, 1921). Control experiments have not confirmed the conclusions of Przibram and his pupils.

Blat (*Arch. f. Ophthal.*, 1924, Bd. 114) has experimented on 400 fresh-water fishes, 80 rabbits, 40 fowls. In the fish he obtained in 26 cases the anatomical survival of the transplanted eye; in the rabbits two cases; in the fowls not one. Even in the cases of anatomical success the result from the functional point of view was absolutely nil; the grafted eye remained completely devoid of sight. On the other hand, Rochon-Duvigneaud has described the condition of the eye of a tench which had remained in the orbit of another tench. Examination of the transplanted eyeball showed that the crystalline lens had perished but not the cells of the anterior lens capsule; the retina had perished but not the choroid. The connective tissue structures, cornea and choroid, retained their vitality.

We are able to report a case in a man. We relate below the result of a veritable auto-plasty of a human eyeball. So far as our knowledge extends no similar observation has been made. Our case is that of a workman in whom as the result of an accident complete avulsion of an eye occurred. The eye was immediately replaced in the orbit from which it had been expelled. The graft succeeded in the sense that the nutrition of the eye was re-established, the globe remained *in situ* and retained its external form perfectly. But the deep structures became extensively disorganized and the visual functions were irremediably abolished. The exceptional character of such an experience in man is intelligible, since cases of complete avulsion of the eyeball are extremely rare.

J.H., male, aged 28 years, on February 19 at 11 a.m., was struck on the left side of the face by a large fragment of metal. He was knocked over by the blow. He was seen by one of us an hour after the accident. The left eyelids were greatly tumefied and showed multiple wounds. The upper lid was torn and completely detached at the inner canthus. The conjunctiva and the orbital tissues were lacerated and infiltrated with blood. The eyeball, completely expelled from the orbit, lay on the cheek; it was held in position by a narrow strip of conjunctiva no stouter than a thread. The sclera was bare; the ocular muscles and the optic nerve had been ruptured at their insertion into the globe. The anterior chamber was filled with blood.

After a rapid disinfection of the wounds the eyeball was replaced as accurately as possible; this was accomplished with difficulty owing to the tumefaction of the tissues and the pain caused by the procedure. The globe was then covered by the lacerated lids; a compressive bandage was applied and the patient removed to hospital. The same day, at 5 p.m. a careful *toilette* and suture of the palpebral wounds was carried out. The appearance of the eyeball was satisfactory and its position normal; no conjunctival suturing was done. The lids were sewn together. A few days later the condition of the man was satisfactory. The palpebral wounds were healing normally.

On March 24 the local condition was entirely favourable; the lids were free from inflammatory signs. There was no protrusion of the globe; it appeared under the united lids to participate in the movements of the fellow eye. On separating the sutured lids the eyeball was found strongly rotated upwards so that the cornea was hidden by the upper lid. It followed exactly the movements of the other eye, but its movements were much limited by a symblepharon which united the globe to a cicatrix in the upper lid near the inner canthus.

The conjunctiva was moderately injected and near the limbus was irregular and scarred. The cornea was quite transparent but completely insensitive. The anterior chamber, which was very deep, contained clear aqueous.

The upward rotation of the eyeball rendered it difficult to examine the iris or lens. It was, however, possible to determine that the pupil was dilated and irregular and filled by exudate; no direct or consensual contraction to light could be obtained. Ophthalmoscopic and tonometric examination could not be made. The eye had no perception of light.

In brief, four months after the operation the transplantation had succeeded in the sense that the eyeball, replaced in the orbit after rupture of all its anatomical connections (save a thread of conjunctiva), maintained its shape and size: its nutrition appeared assured, a result which will probably be lasting: on the other hand there was no functional recovery whatever."

J. B. LAWFORD.

(2) **Duke-Elder, W. S. (London).—The pathological action of light upon the eye.** *Lancet*, June 12 and 26, and July 3, 1926.

(2) **Duke-Elder's** article, in three parts, deals with (1) action on the outer eye: photophthalmia; (2) action upon the lens: theory of the genesis of cataract; (3) action upon the retina. No one who is interested in light and the eye should fail to study it, for it is probable that never has this difficult subject been more

lucidly put before us. An abstract cannot do justice to the article. The following notes may be considered merely as indicators to the subjects discussed.

Part I deals with photophthalmia, its pathogenesis and pathology, clinical symptoms, occurrence industrially and under natural conditions, and its treatment. The biological action of light upon the eye varies with the wave-length. The longer waves increase molecular movement and produce a thermal effect. The shorter waves increase atomic motion and produce molecular disintegration. Absorption and transmission of different wave lengths by the cornea are studied. The rays producing photophthalmia are the shorter ultra-violet; for all practical purposes it is the rays below 3,000 Angström units which excite the condition, the most potent being those from 3,000 to 2,500. Since the disturbance is the direct result of the absorption of energy, not only is there a critical wave-length, but there is also a very definite critical quantity of energy required to set up a reaction, and a knowledge of its magnitude is important in deciding the dosage for local treatment of diseased conditions. The author contrasts the pathological findings in lesions due to ultra-violet light and in those due to heat rays. The clinical symptoms, better known to the practitioner perhaps than the underlying causes, are clearly stated. The next sections deal with industrial photophthalmia by arc lamps, short circuits, etc., and solar photophthalmia, such as snow-blindness so called. As to treatment, prophylaxis is the most important. For exposures of ordinary intensity and short duration, ordinary spectacles afford sufficient protection. With severe or prolonged exposures ordinary glass will allow the transmission of waves capable of producing a violent reaction. For purposes where it is wished to screen off the ultra-violet alone Crookes' A. glass is the most efficient; where the visible part of the spectrum is to be partly cut off Crookes' B., or ordinary smoked glass. Other recommendations are also made for infra-red, etc. When an attack has commenced, bromide and aspirin control the neuralgia; locally, cocaine in oil, bandaging with cold compresses or plunging the head in cold water.

Part II deals with the action of light upon the lens and involves a theory of the genesis of cataract. The reviewer feels that he might do the author an injustice if he attempted to synopsize this part of the article and will content himself with giving the "conclusion" textually.

"The thesis advanced, therefore, is that the primary cause of cataract generally is probably to be associated with the direct action of incident radiant energy of any wave-length on the lens, increasing the lability of its colloidal system and deranging the autoxidation system upon which its metabolism depends. This

renders its proteins more prone to coagulation by changes in the hydrogen-ion concentration (which also affects the autoxidation system directly), changes in the salt content, osmotic changes determined locally by the action of radiant energy on the lens capsule or by general metabolic disturbances, and by possible continuous photosensitization. To these must be added the influence of more subtle factors inseparable from the economy of so complex a physico-chemical mechanism as is living matter; but in the present state of our knowledge it seems most profitable and fertile to try to elucidate these processes by reducing them as far as possible to the known laws of chemistry and physics, instead of taking refuge behind these meaningless terms so frequently used in pathological thought—malnutrition, degeneration, and toxic action."

Part III deals with the energy incident on the retina, pathological effects, thermal effects, and the clinical occurrence of retinal lesions. In the first of the above paragraphs the reviewer will attempt to bring out only two points, namely, the range of wavelengths reaching the retina and the concentration of energy on the retina by a source of intense light subtending a small solid angle, such as the sun.

The nature of the light incident upon the retina is determined by the transmission and absorption of all the ocular media. Above 12,000 Angström units (infra-red) the energy which reaches the retina is practically negligible. Thereafter the transparency increases rapidly, until at 7,000, the commencement of the visible red, 94 per cent. falls upon the retina. From this point the media may be considered transparent until the lower part of the visible spectrum is reached (ultra-violet). "We may take it, then, that the retina is reached by practically all the waves between 4,000 and 7,000 (the visibles) and by a part of those between 7,000 and 12,000 (infra-red) and between 4,000 and a limit varying about the region 3,200 (long ultra-violet)."

With regard to concentration of energy at the retina the author, after discussing losses in transmission due to absorption by the media and dissipation due to optical heterogeneity, proceeds as follows: "Counteracting these two influences the refraction of the optical system of the eye concentrates the energy to a point on the image on the retina of the emmetrope, a concentration which when high intensities are involved, may readily produce pathological effects here while leaving the structures in the anterior eye unaffected. In contradistinction to what we have seen to obtain in the consideration of the energy distribution in the lens, since the retinal image of a large body is itself large and widely spread out, for the same total intensity of radiation, the greater the intensity of the source, the smaller the energy concentration at

the retina; the main danger to the retina, therefore, lies in sources subtending a small solid angle and radiating with high intensity, *e.g.*, the sun."

Pathological effects caused by light upon the retina may occur (1) by overstimulation; (2) by thermic action; (3) by abiotic action. With regard to (1) the author discusses fatigue; (2) deals with experiments by various authors; (3) after discussing the difficulty in producing abiotic changes since only the longer ultra-violet rays can reach the retina, the author concludes this portion with these words: "It seems reasonably certain, therefore, that the retina is adequately protected by the ocular media from abiotic rays under all ordinary circumstances; but it is probable that extreme exposures for long periods may injure it, and the possibility of ultimate damage from exposures of less extreme intensity but over periods lasting many years is not without the bounds of possibility."

The author's last paragraph in connection with retinal lesions deals with sun-blindness (of which eclipse blindness is typical), and with industrial light effects. This may well be read in the original. (The bibliography contains well over two hundred references.)

ERNEST THOMSON.

(3) **Lacat.—Quinine amblyopia and its treatment.** (**Amblyopie quininique et son traitement.**) *La Clin. Ophtal.*, July, 1925.

(3) The case of quinine amblyopia recorded by **Lacat** is important for two reasons. In the first place it shows the value of Abadie's treatment for spasm of the central retinal artery, namely, by intraorbital injection of atropine, and secondly, because of the suggestion thrown out by the author that optic atrophy following malaria may be due not to the malaria but to the quinine employed in the treatment of the malaria. In the actual case here recorded the patient, a malarial subject, in the endeavour to ward off an attack swallowed five grammes of quinine in one hour. He slept for twenty-four hours and awoke deaf and blind. He recovered from the deafness and the vision was gradually returning and would presumably have gone on improving had not the patient's doctor insisted on considering the condition as syphilitic, in spite of evidence to the contrary, and employed intensive anti-syphilitic treatment. When the patient came under the care of Lacat the latter found white discs with sharply-defined edges, very narrow arteries, normal veins and no other fundus lesion, while *the pupil reflexes were retained on both sides.* Under Abadie's treatment with atropine and the use of the continuous current the spasm ceded and the fields increased. "The success

of antispasmodic treatment, and the failure of other treatment seems to confirm very well M. Abadie's idea that the optic atrophy caused by quinine is really the consequence of spasm of the central retinal artery." In the case referred to above the optic atrophy had been incorrectly supposed to be syphilitic in origin rather than malarial, but there are other cases on record in which the optic atrophy was supposed to be directly due to malaria; some at any rate of these cases the author thinks have really been due to the quinine employed in the treatment of that disease. It is obvious that the point is a very important one since the continuation of quinine treatment with the object of subduing a supposed malarial manifestation which in reality is a manifestation of quinine poisoning is very distinctly like steering north by south.

ERNEST THOMSON.

(4) **Comberg, W.—Observations upon the vitreous. (Beobachtungen am Glasskörper.)** *Klin. Monatsbl. f. Augenheilk.*, Bd. LXXII, S. 692.

(4) Until recently our conceptions of the structure of the vitreous were hazy. Opinions varied according to the methods employed, and the animals investigated. For a long time opinions oscillated between the idea that the vitreous was like an orange with radial cavities (Hannover) or, that it was like an onion with four chambers (Brücke). Hannover suggested that a cuticular structure prevented the fluid part of the vitreous from escaping. Bowman, as early as 1849, suggested a fascicular structure for the vitreous. Virchow considered that these fibres formed a fine network which constituted the framework of the vitreous. He said that the network was too fine to allow the passage of a blood cell, in fact it was almost molecular. Long ago many tried to prove that the structure was a true cell, but without conspicuous success. At that time the chemistry of colloids was so little understood that Virchow could not accept the cell theory because he could not understand how fluid could enter and leave a cell, and it seemed to him essential to presume that the vitreous must be a fluid confined in definite cavities. At that time it was not common knowledge that hydrophile colloids existed from which fluid could be expressed and re-absorbed. Baurmann made an important advance when he discovered ultra-microscopic structures that almost made the colloidal nature of the vitreous a certainty. He strongly emphasized the error of regarding the fluid in the vitreous as a derivative of the aqueous. The fluid is colloidal and is tied to the solid part of the vitreous gel much as the water of crystallization is contained in a crystal. It is only after mechanical insult, in old age, or by reason of general systemic change that the fluid leaves the gel in any quantity. **Comberg** has confirmed

Baurmann's conclusions. Examining the fresh vitreous of sheep, cattle, and pigs, under the ultra-microscope, he was able to see bodies which could only have a definite reach in one dimension, whereas in two dimensions they did not overstep ultra-microscopic size. (The reviewer confesses that he cannot grasp this conception.) The fluid which was expressed did not contain these structures, showing that fluid expressed from a vitreous cannot ever replace true vitreous. These investigations seem to prove that the vitreous is a true gel and that its fluid is, for the most part, definitely chemically combined. Observations with the slit-lamp would seem to confirm the views of those who regard the vitreous as a fibrillar structure with clefts containing fluid. The fibrous structure seen was held by slit-lamp workers to be the true scaffolding of the vitreous, forgetful of the fact that it is impossible to see the true formation with a magnification of at best 100. At the most, the slit-lamp can give us an approximate idea of the structure. It is obvious that the mass of the vitreous cannot have the gross fibrillar structure that many, including slit-lamp workers, ascribe to it. Even in those areas which appear to the slit-lamp observer to be clear and empty there is a gel of reasonably firm consistence. The behaviour of fine particles and delicate structures in these blank regions confirms this conception. There is a definite difference between the actions of particles and fine threads in a fluid and a gel. We can demonstrate the difference by taking two glass phials, one filled with dirty water containing particles, the other with a thin gel also filled with similar particles, and observing the two with the slit-lamp. If we gently twist the phials the fluid shows a slow streaming from side to side, whereas the gel behaves differently. It follows the twist of the container, and merely shudders from side to side, or if the gel is thicker, only waves. Bodies in the vitreous move as in a colloid and not as in fluid. When the vitreous is becoming fluid the movement of particles and strands is not of the nature of a shudder, but definite streaming is detected. The detection of these abnormal motions is not easy and demands long practice with the slit-lamp.

The author does not believe that the vitreous can become fluid merely from age. It is quite common to find a perfectly normal vitreous in persons over 80, and when changes are found they are probably associated with arterio-sclerosis and consequent faulty metabolism. The fact that a fluid vitreous is frequently associated with nuclear cataract does not render this view less likely.

The most advanced liquefaction is seen in myopia, and Vogt is probably correct when he suggests that the clouds that float in this type of vitreous are the degeneration products of the vitreous framework. With the slit-lamp it is easy to ascertain that such opacities wander here and there when the eye moves but never

return to the same spot. The periphery, where the vitreous is more firmly attached, is spared to the last, whereas the central parts are the first to deteriorate.

In the opinion of the author there is no communication round the equator of the lens between the posterior chamber and the vitreous chamber unless there has been an injury. Even after a pretty severe injury such as cataract extraction the boundary can remain intact. After an extraction with iridectomy one can see in the coloboma that the peripheral parts of the vitreous have not participated in the liquefaction. Maximal fluidity and destruction of the vitreous with free communication between the vitreous chamber and the anterior chamber are seen in cases of high myopia after Fukala's operation, especially when such have had a subsequent discission.

Observation of the vitreous in early cataract has an important clinical significance and in all examinations of early cataract the state of the vitreous should be noted for future reference. The knowledge that he is faced with a liquid vitreous is of the greatest help to the operator. If one lens is opaque and the other sufficiently clear the consistence of the vitreous in this eye will give some indication of that behind the cataract.

Observations can be made with the slit-lamp upon the segmentation of the vitreous. The most striking are the lamellar structures behind the lens. The first surface stands behind the posterior pole and has a membranous appearance. It is found at a definite distance behind the lens and tends to hang with its upper edge forwards and its lower edge somewhat more posterior. To understand this appearance we must recollect that the hyaloid artery in embryonic life lies axially, but that the persistent artery so often seen with the slit-lamp hangs down parallel to the first membrane as though drooping with its weight. We may therefore assume that the first membrane originally lay axially, but later was drawn down by the weight of the vitreous. These membranous structures were not originally parallel to the back of the lens and do not in any way support an onion-like architecture of the vitreous. These membranes are regarded differently by some authors who see in the first the face of the vitreous and regard the region anterior to it as Berger's space, the retro-lental space. The author will have nothing to do with Berger's space which, in his opinion, is a mere capillary cleft behind the lens. It is certainly striking that the first membrane often distinctly waves about and has a membranous appearance. It gives the impression of a fine cloth hanging in a space behind the lens, and it is easy to take it for the face of the vitreous, but by using a good illumination and a very narrow beam it is always possible to see between the apparent surface of the vitreous and the posterior lens surface other tenuous films, and in cases where the vitreous contains deposits these

can be traced right up to the lens. It is impossible with the slit-lamp to decide whether these structures are precipitates from the colloid substance of the vitreous or whether they are embryonic remains.

Prolapse of the vitreous into the anterior chamber is very common after discission operations. No matter how delicately and how tangentially the capsule is cut, it is almost impossible to avoid wounding the condensed outer layer of the vitreous, and the layers behind herniate through the aperture into the anterior chamber. Sometimes the whole chamber is occupied with these structures, but often the hernia is a small cyst which does not trespass beyond the mid line of the chamber. The vitreous, the author states, is so transparent that it can hardly ever be detected without the slit-lamp, and that for this reason its presence was overlooked before the slit-lamp was used. The reviewer cannot agree with this statement. If the structures be adequately illuminated with the focal beam from a 60 candle-power half-watt lamp the prolapse is almost always visible with an ordinary loupe, and may be recognized not only by its refringence but by the pigment granules which are invariably seen in its substance. The author ascribes the discovery of these prolapses to Peters, who drew attention to them in a publication in an American journal in 1923. As a matter of fact, Vogt described them with drawings in his slit-lamp course in 1923, and must certainly share the merit of the discovery. Often haemorrhages can be seen in these prolapses and they are isolated between the lamellae. Two very beautiful drawings illustrate these segregated haemorrhages, and this fact alone would tend to disprove the theory that the author seeks to establish, the theory that the vitreous is not universally segmented but is a gel with a few isolated membranes of embryonic origin floating about in the gel.

After contusions and wounds of the ciliary region large haemorrhages often take place. If these arise in front of the vitreous mass they spread into the posterior chamber and are often, the author thinks, in consequence of the large surface of the zonular fibre mass absorbed and retained by this structure. For this reason the blood can lie round the lens equator and become pasted over the posterior lens surface as far as Wieger's ligament (what is this ligament?). This is the genesis of blood rings like those described by Ascher. In other cases the vitreous is so strained by the accident that Wieger's ligament tears and then the haemorrhage runs along the posterior lens capsule and arrives in the slit-like Berger's space where it forms a kind of hyphaema. If the tension on the vitreous is greater the connection between the vitreous and the lens is torn away and the blood forces its way in thin layers between the torn off hyaloid and the posterior lens capsule, spreading in finger-like processes across the lens capsule. Another fine drawing illustrates

this effect, which indeed is not infrequently seen when contused eyes are examined with the slit-lamp. In other less common cases the haemorrhage is seen in the vitreous itself and spreads in spicules radiating from the site of the injury, the stalactite-like haemorrhages described by Koeppe. The same condition has been figured by Fuchs in microscopic specimens.

Wounds of the vitreous in the ciliary region may lead to shrinking of the vitreous which may not only cause traction of the anterior layers close to the posterior lens capsule, but may end in a permanent divorce of the vitreous from the lens. Such a case is illustrated by a drawing. Wounds in the region behind the ciliary body are naturally invisible with the slit-lamp, even when Koeppe's method is chosen, a technique which the author has not found very useful, but after this type of injury there are often distant effects which can be reached by the slit-lamp. These take the form of rather coarse fibres which appear first in the region of the wound but later on the opposite side. A drawing of this condition is given. One cannot escape from the conclusion that these fibres may have much to do with the retinal detachment which frequently follows wounds of this type. It is probable that on account of their extraordinary delicacy (we must point out that the author has just said that they were *massive*, and that those shown in the drawing are very thick) they have probably been overlooked by many observers, especially as they are not visible by transillumination. If, however, they are found in many cases they would strongly support Leber's view of detachment.

The reviewer would point out that Vogt teaches that ***striation of the vitreous***, not fibre formation, is almost invariably found after any perforating wound of the sclera, and that its discovery is tantamount to a diagnosis of perforation. He has himself found not only striation of the vitreous but also diagonal striation of the posterior capsule in almost every case of perforation of the sclera that he has been able to examine with the slit-lamp, and has followed up two cases, and has seen the striations disappear and the vitreous return to normal. The appearance seen is not of necessity due to the formation of fibres, in fact in the majority of cases this cannot be the case, for the striation is seen far too early, say, within a week of the accident, for actual fibres to be formed. A drawing of the striation of the posterior capsule will be found in the *Trans. Ophthal. Soc., U.K.*, Vol. XLV, p. 883, and this case was watched till the lens capsule and the vitreous reassumed their normal appearance.

T. HARRISON BUTLER.

BOOK NOTICES

Anatomie élémentaire des centres nerveux et du sympathique, chez l'Homme. By P. GILIS, Prof. d'Anatomie, Montpellier. 232 pages avec 35 figures. Paris: Masson et Cie. Prix 20 francs.

The author's aim in writing this book is to present to students of medicine a description of the anatomy of the nervous system, central and peripheral, with especial reference to the sympathetic system, in accordance with the most recent research. As it is now acknowledged that division of the nervous structures into two systems, which the old anatomical nomenclature of "cerebro-spinal" and "sympathetic" emphasized, is erroneous, it is essential that the complete unity of the two systems and their constant inter-action should be recognized and taught. The researches of Langley, Gaskell, and Guillaume are mainly responsible for the modern conception of that portion of the nervous mechanism known as the sympathetic or "involuntary" (Gaskell's term) nervous system. French writers apply the term "système nerveux de la vie de relation" to the voluntary nervous system, and "système nerveux de la vie végétative" to the involuntary nervous system. The volume, which appears to represent Professor Gilis's University Course of Instruction on the nervous system, contains an introductory section on the development of the brain and spinal cord including histo-genesis. Following this is Part 1: the voluntary nervous system, sensory and motor, central and peripheral. In this part will be found a few pages on "clinical deductions" in which are contained the anatomical explanations of certain well-known clinical manifestations, *e.g.*, the Brown-Séquard syndrome. Part II: the involuntary nervous system (sympathetic) with sub-headings; the great sympathetic; the para-sympathetic; including the sensory, motor, and secretory nerve centres and peripheral distribution. Part III contains a section on the involuntary nerve connections of the eyeball and orbit, with an instructive diagram of the irido-dilator supply from the great sympathetic system.

The book is commendable from every point of view. The author writes well and explicitly on a subject easily made complex by lack of clarity. The illustrations with one exception, are diagrammatic; they are agreeably uncomplicated and very helpful. Paper and type are both good. Students familiar with the French tongue will gain much from a perusal of this book.

Les syndromes hémianopsiques dans le ramollissement cérébral. By Dr. SUZANNE SCHIFF-WERTHEIMER. 160 pages with 38 figures in the text and 2 coloured plates. Paris: Gaston Doin et Cie. Prix 22 francs.

The first portion of this book deals with the anatomy of the visual pathways from the chiasma to the cortex and with their blood supply. This is followed by a short account of methods of examination in which the author emphasizes the sparing of the macular region which is such a notable feature in hemianopia due to vascular lesions. She also mentions an investigation she has made into the "gnosic" field or field of recognition of objects. Various objects were tried and playing cards were found to be the most satisfactory. The limits of the gnosic field were found to be between the normal limits for blue and red fields. The rest of the book is devoted to a detailed description of the syndromes associated with blockage of the posterior cerebral, middle cerebral, and anterior choroidal arteries respectively. Hemianopia occurs in all three but the distinguishing characteristics are briefly as follow:

1. The posterior cerebral: the thalamic syndrome is present, and if the lesion is in the left hemisphere, there is also aphasia and often alexia. Quadrantic losses of field are particularly common in lesions of this vessel.
2. The middle cerebral; the hemianopia is due to a lesion of the optic radiations, and the accompanying symptoms vary according to the degree of involvement of the vessel or its branches. When only the deep branch is involved, hemianopia is usually absent.
3. The anterior choroidal artery; the syndrome is rare, but well differentiated. It comprises homonymous hemianopia, hemiplegia, and hypoaesthesia without aphasia, and without coma at the onset.

An account is given of fourteen cases of vascular lesions producing hemianopia, and the book concludes with a summary of the main points brought out in the text.

The author is to be congratulated on a useful piece of work in bringing together a series of observations which will be of interest not only to ophthalmologists, but also to neurologists and general physicians.

Revue Internationale du Trachome. January, 1927.

The late Dr. Paul Gouzien has an article dealing with the danger to France caused by trachomatous immigrants. He reports that a Government order has now been issued providing that all foreign workmen, of whom there are a large number entering annually, shall be medically examined before admission into the country. The author points out the importance of making a

special examination of the everted lids of each immigrant, in view of the fact that trachoma is a notifiable disease in France.

Professor Tchirkovsky, the Director of the new Trachoma Institute at Kazan, Russia, points out the enormously heavy infection with trachoma of the inhabitants of the Volga region, reaching in some places 95 per cent. of the population. He rejoices that the admirable travelling ophthalmic hospitals, started by Professor Bellarminoff under the old *régime* in Russia, are being again commissioned, after having been stopped since the revolution. It may be remembered that these hospitals served as a model for the creation of the first of the Egyptian Travelling Ophthalmic Hospitals, at the suggestion of Dr. Osborne of Alexandria.

Dr. Zachert contributes an article on the strife against trachoma at Cracow in Poland, giving details of the excellent work carried on there. Dr. Elena Puscariu, who has, evidently, had great experience in the treatment of trachoma at Jassy, Roumania, states that all cases of trachoma require daily cauterization of the palpebral conjunctiva with copper sulphate stick or other drug, for fifteen to seventy days, after the preliminary mechanical treatment has been carried out.

Report of the Government Ophthalmic Hospital, Madras, 1926. By LT-COL. R. E. WRIGHT, Superintendent, Madras. Printed by the Superintendent, Government Press. Price 2 rupees. 1927.

The main features of these valuable reports are well known to our readers; the present report maintains the high standard set in previous years. The appointment for one year of an honorary surgeon, instituted last year, was continued in the person of Captain V. D. Nimbkar. During the year Dr. A. S. Green of San Francisco visited the hospital and demonstrated his method of intracapsular extraction of cataract. There was an increase in the total number of cataract cases dealt with during the year. 1,364 cataracts were removed with capsulotomy; there were three Smith's operations; five Barraquer's, and sixteen by Green's method. During the year a bacteriological investigation of iris tissue removed at the time of performing the iridectomy during routine cataract work was undertaken. There were 44 positive findings out of 205 cultures. Statistical work on the relation of glare to the frequency of cataract was disappointing. Only 96 cases of primary glaucoma were trephined. Cases of secondary glaucoma were excluded from this form of operation.

Details of several interesting cases are given, among which we may note a case of the association of myiasis with chronic degeneration of the cornea, eggs of aphiochaeta scalaris deposited on the

diseased cornea; bilateral lymphoblastoma of the orbit with leucaemia showing cell inclusions; two uncommon orbital tumours; and an interesting sequence of congenital glaucoma in four Hindu males. Illustrations of the more important cases are included.

OBITUARY

ANDREW STANFORD MORTON

THE death of Mr. Stanford Morton was noted in our last number. An elder son of the late John Morton, M.D., of the old H.E.I.C.S., he was educated at Edinburgh and University College, London. He qualified M.B.Edin., in 1874, and took the F.R.C.S.Eng., in 1888. His first ophthalmic appointment, so far as we are aware, was that of House Surgeon at Moorfields, where he had as a colleague the late Mr. Marcus Gunn. As Clinical Assistant at Moorfields he served for the extremely long period of sixteen years before he was elected to the staff. Before this he had held the post of Surgeon to the Royal Eye Hospital, Southwark, and at a later date, that of Ophthalmic Surgeon to the Great Northern Hospital, while rather late in life he accepted the post of Ophthalmic Surgeon to the Italian Hospital. He retired from practice in 1920, and went to live at Clifton, where he died on April 11 in his seventy-ninth year.

Morton's fame will last as long as the ophthalmoscope which bears his name endures; since its inception it has never been improved; in fact it is to be doubted whether it is capable of improvement; it has undoubtedly been the best on the market ever since, and we should be surprised to hear of any other being generally used at the present time.

There can be no question that Morton was, in his day, unsurpassed as an operator upon the eye. In particular, his results in cases of conical cornea, in which he had excised a small elliptical piece of the cone, were surprisingly good. For many years he conducted an operative surgery class, and many of those who were his students will remember the infinite trouble he took to improve their operative technique. His best-known work was a small handbook on Refraction of the Eye, which went through several editions; he was a first class draughtsman, as is exemplified by reproductions of several of his beautiful ophthalmoscopic drawings among the coloured plates of the *Transactions of the Ophthalmological Society*. He did not write much, nor did he take any great part in the meetings of the Ophthalmological Society, of

which he had been an original member, and at one time Vice-President.

On completion of his time of service at Moorfields he was elected Consulting Surgeon to the Hospital; and he received the honour of Chevalier of the Crown of Italy for his services in connection with the Italian Hospital.

NOTES

Deaths

WE learn with deep regret of the death on May 2 of Professor E. H. STARLING, F.R.S., the well-known physiologist, while on a visit to the West Indies. Of Starling's great work as a physiologist this is not the place for a detailed account, but we may remind our readers that he published two papers in 1904 and 1906 on the intraocular pressure in collaboration with E. E. Henderson.

We have also to record with much regret the death of Mr. WAREN TAY. We hope to publish an obituary notice in our next number.

* * * *

Presentation to Mr. Treacher Collins

Mr. Treacher Collins, on his retirement from the consulting staff of the White Oak School, Swanley, was presented by the staff and children of the school, with a silver cup as a token of appreciation of his services, extending over many years, to the Institution.

* * * *

Cataract

WE are indebted to Mr. C. J. Henderson, of Sind, President, Blind Relief Association, for the information that the ordinary Indian word for a cataract is "Moti," which means pearl, but that cataract is also called "moti pāni" (pearl water). Glaucoma is "karo pāni" (black water) in Sindhi.

FUTURE ARRANGEMENTS

1927

June 10.—Royal Society of Medicine, Section of Ophthalmology (Annual).

July 7-9.—Annual Meeting of the Oxford Ophthalmological Congress at Oxford.

July 20-22.—The British Medical Association, Section of Ophthalmology, at Edinburgh.